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Farm Chemicals

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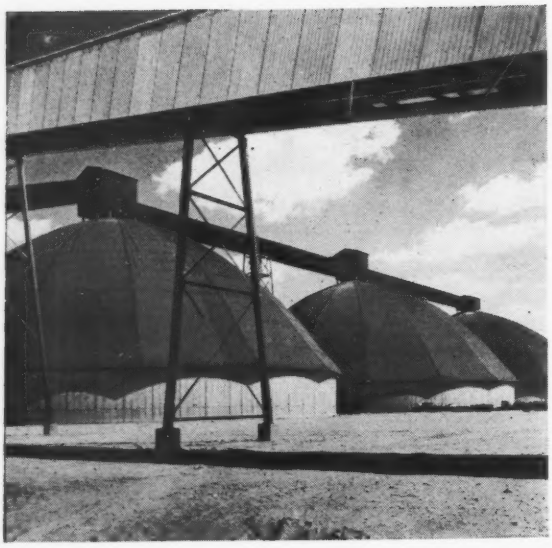

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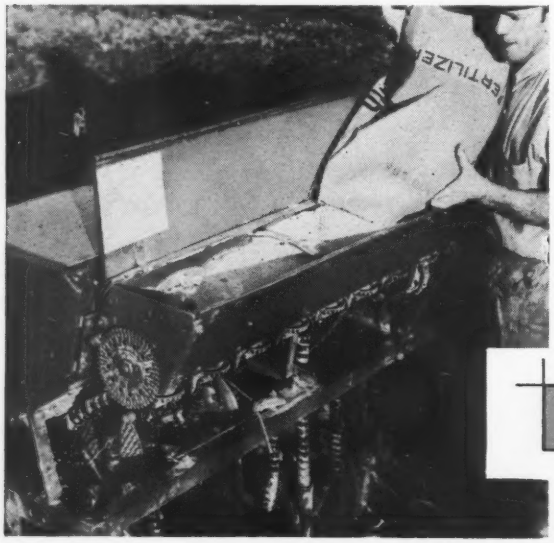

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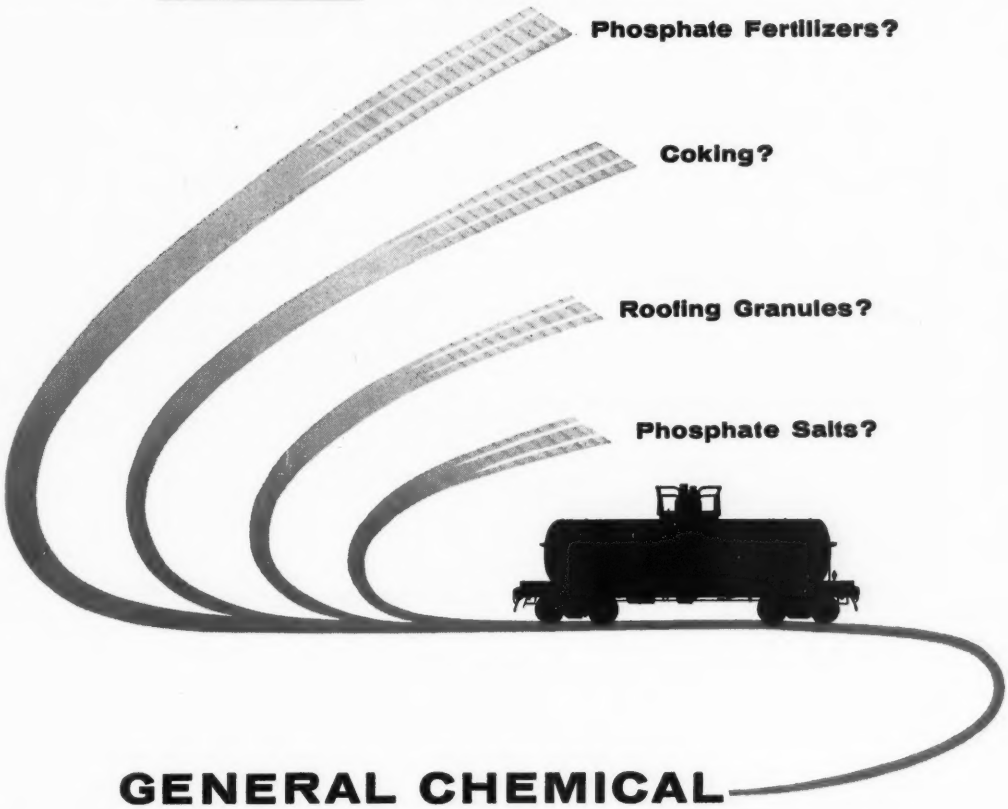

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IN THIS ISSUE

The highlight in farm chemicals news this month is no doubt the announcement of the proposed expansion program to be undertaken by the National Plant Food Institute. The expansion program as envisioned by the Institute's Board of Directors will include vast expansion into the fields of research, farm demonstrations, education and promotion.

A group of the potash producers who are members of the American Potash Institute voiced objection to the way the program would be financed. For full details on this and the NPFI annual meeting start reading on page 42.

Just as important as putting on fertilizer is the way in which you put it on. This holds true not only for farmers, but for application along highways also. We have a photo review this month of some of the methods and machinery available for the roadside application of fertilizer. See page 48.

Each year about this time there comes a release from the United States Department of Agriculture which covers the fertilizer and plant food consumption picture for the previous year. It contains valuable information and as in the past FARM CHEMICALS is reprinting the entire release for your information. It starts on page 50.

Dr. R. H. Wellman, Manager of the Crag Agricultural Chemicals Department takes a penetrating look at his sales staff and some of the principles which govern their activities. The article begins on page 40.

COVER STORY

Applying fertilizer along roadsides is important, but so is the way you apply it. This tractor-spreader can fertilize about five acres an hour and requires only one man to operate it. Two men make the job easier. Width of the swath is 8 to 12 feet. The equipment works well on flat areas, but cannot be operated on rough terrain. For more information on roadside fertilizer application methods see page 48.

Farm Chemicals

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PIONEER JOURNAL OF THE INDUSTRY

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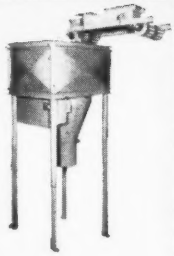

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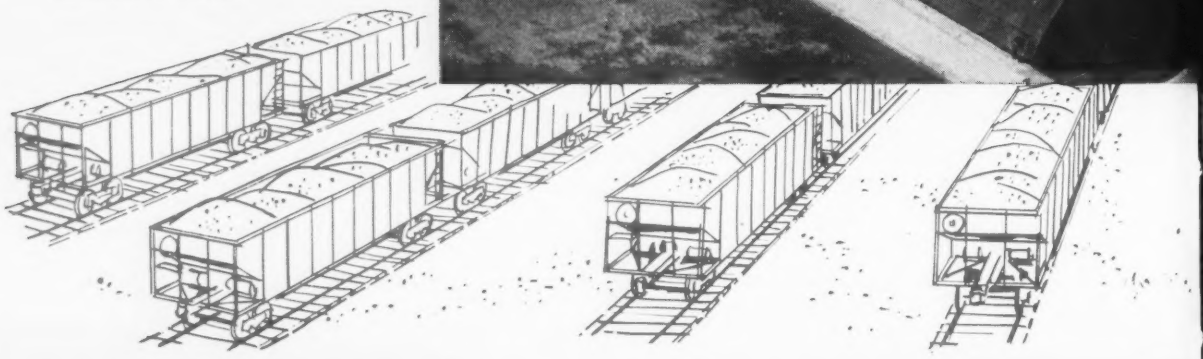
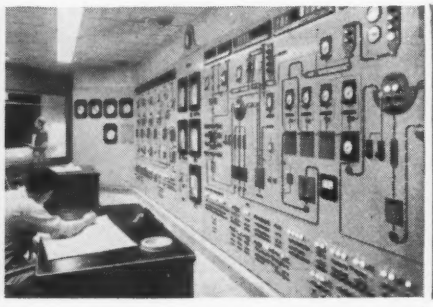


Round-the-clock production takes the push out of peak season demands. Mammoth off-season storage capacity plus the industry's finest delivery schedules assure you high-quality triple when you need it.

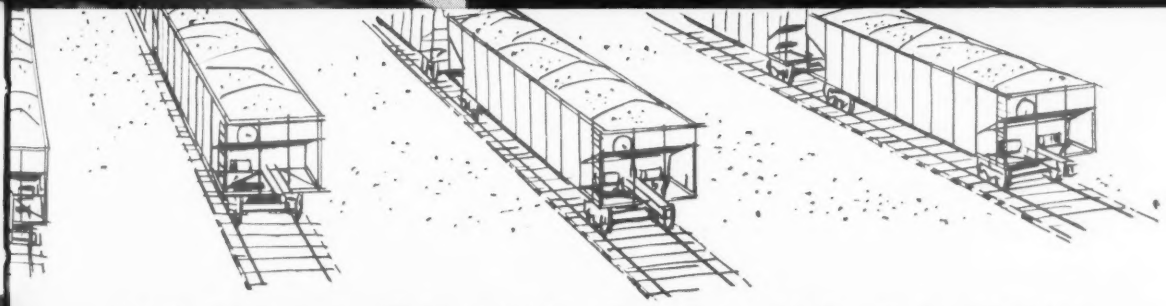


These "doodads" and dials get results . . . guard the uniformity and quality of every batch of triple super from Bonnie . . . help assure you of top ammoniation results every time.

MINERALS International CHEMICALS

are this year's contracts

They tried . . .
were satisfied
. . . and signed



In just one year, over ¼ million tons of triple super sales have switched to Bonnie. That's how we know there's a new sense of satisfaction among triple super users this year.

In typical cases, manufacturers ordered spot shipments . . . tried our triple . . . and were satisfied. And before long, the word got around — "International's new triple is *really* good." In fact, even nitrogen producers began recommending our triple to their customers with ammoniation problems. The reasons?

Reliability — one high-quality source. *Quality* — unbeatable control with product uniformity that makes formulation easier. *Fast service* — mammoth inventory at conveniently-located warehouses. *Priced right* — to help you meet competition. *Friendly cooperation* — from International's transportation department. *Technical assistance* — that helps cut formulation costs.

If you have not already signed, we invite you to consider International.

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CSMA RELEASES RESULTS OF INSECTICIDE SURVEY

Nearly 17 million gallons of liquid and slightly more than seven million pounds of powder insecticides were sold in the United States last year to keep human beings and their animal charges ahead of the bugs, the Chemical Specialties Manufacturers' Association said recently. CSMA reported the results of its 1956 Survey of Household and Industrial Insecticides on May 22 at its annual meeting.

Space sprays chalked up the biggest sales gain, accounting for 4,188,304 gallons, as compared with 1,797,515 gallons in 1955.

Total sales of liquid insecticides in 1956 amounted to 16,968,600 gallons, up 60 per cent from the 1955 total of 10,557,386 gallons. CSMA pointed out, however, that 1956 figures included 2,366,533 gallons of area fogging sprays, a category not reported in the association's four previous annual surveys. Discounting such sprays, the association reported that liquid insecticide sales in 1956 still were 38 per cent higher than in 1955.

Gains over 1955 also were registered by DDT residual sprays, fabric pest sprays, emulsion concentrates other than livestock insecticides and vaporizer chemicals. Principal decreases were in packaged chlordane and dieldrin sprays, packaged oil base livestock sprays, livestock emulsion concentrates, livestock wettable powders and cattle smears and other screw worm remedies.

The survey results were based upon confidential reports of sales from 173 U. S. producers of insecticides.

PRODUCTION BEGINS AT DuPONT PARZATE UNIT

A new unit to manufacture Parzate liquid nabam fungicide has gone into production at Du Pont's Grasselli, N. J., Works.

Clark W. Davis, general manager of the Grasselli Chemicals Dept., said that this, their second unit to produce Parzate, would double capacity for the chemical. The company's other unit is located at Houston, Tex.

CRAG MOVES SALES HQ.

Crag Agricultural Chemicals has moved its sales headquarters from New York City to new suburban offices at 180 South Broadway, White Plains, New York, according to an announcement by Union Carbide Chemicals Co., Div. of Union Carbide Corp.

The technical development group is included in the move. No other Union Carbide Chemicals offices are involved, the firm reported.

SPENCER CHEM. OPERATES PILOT MIXING PLANT

A pilot fertilizer mixing plant for research and demonstration was officially dedicated May 15 by Spencer Chemical Co. Located at Spencer's Jayhawk Works near Pittsburg, Kans., it will be used to develop research work on mixed fertilizer processing and make information available to all fertilizer manufacturers through demonstration and reports.

The pilot plant will be operated by Spencer's Research and Development group, and information will be disseminated by the Agricultural Chemical Div.'s Technical Service Dept.

Equipment in the plant includes an ammoniator-granulator, dryer, cooler, screens, crushers, accurate metering devices and temperature recording equipment necessary to develop the most efficient process information.

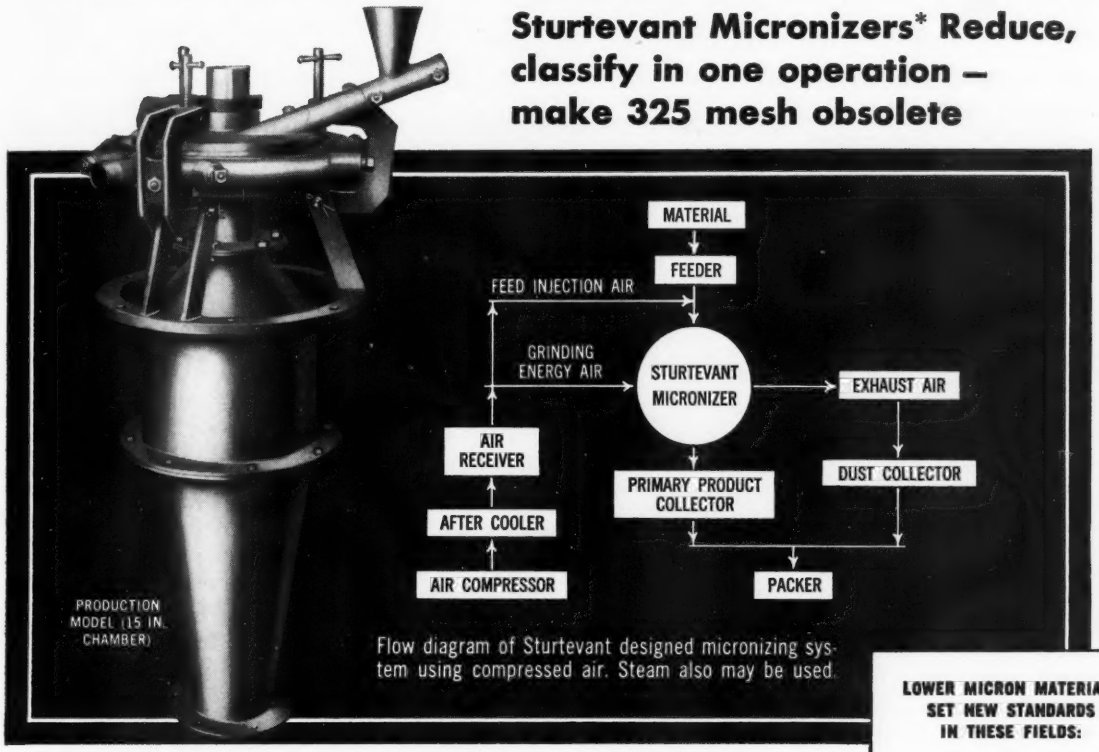
FERTILIZER SPREADING BY GLF

Trucks of Coop. GLF Exchange engaged in soil building services to member farmers in New York, New Jersey and northern Pennsylvania spread more than 500,000 tons of lime and fertilizer in 1956.

Newest units of the 175-truck fleet GLF employs in this agricultural service are like that pictured above at Nichols, N. Y., International Harvester RF-192 tandem models. Spreading gear, fabricated in GLF shops at Ithaca, was designed by the cooperative's Soil Building division.

Need ½ to 44 Micron Particles?

Sturtevant Micronizers* Reduce, classify in one operation — make 325 mesh obsolete



Flow diagram of Sturtevant designed micronizing system using compressed air. Steam also may be used.

Particles Grind Each Other, Classifying is Simultaneous; No Attritional Heat

One operation. Sturtevant Micronizers grind and classify in a single fluid-jet chamber — provide fines in range from ½ to 44 microns to meet today's increased product fineness requirements. Because of impact action and cool atmosphere, even heat-sensitive materials can be handled.

No moving parts. Particles in high speed rotation, propelled by compressed air or steam entering shallow grinding chamber at angles to periphery grind each other by violent impact. Design provides for instant accessibility, easy cleaning.

Simultaneous classification. Centrifugal force keeps over-size materials in the grinding zone, cyclone action in central section of chamber classifies and collects fines for bagging. Rate of feed and pressure control particle size of fines.

Can combine other processes. Sturtevant Micronizers can be adapted for coating one material with another and for effecting chemical reactions and changes in physical characteristics, while in process of reducing solids to micron size.

Eight models available. Grinding chambers are in eight sizes, ranging from 2 in. diameter laboratory model (½ to 1 lb. per hr. capacity) to large 36 in. diameter production model (500 to 4000 lbs. per hr. capacity). Send today for fully descriptive literature.

LOWER MICRON MATERIALS SET NEW STANDARDS IN THESE FIELDS:

Pharmaceuticals
Pigments (natural and synthetic)
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Sugar
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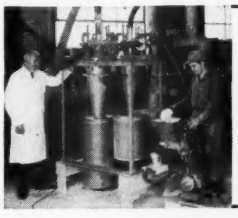
Magnesium compounds
Zinc compounds
Waxes and fatty acids
Fungicides and insecticides

Fluid-Jet Systems For Special Needs

A 30 in. Sturtevant Micronizer is reducing titanium dioxide to particle size under 1 micron at a feed rate of 2250 lbs. per hr. For another firm, a 24 in. model grinds 50% DDT to 3.5 average microns at a solid feed rate of 1200 to 1400 lbs. per hr. A pharmaceutical house is using an 8 in. model to produce procaine-penicillin fines in the 5 to 20 micron range. Iron oxide pigment is being reduced by a 30 in. Micronizer to 2 to 3 average microns at rates of 1000 lbs. per hr. Sturtevant Engineers will help you plan a Fluid-Jet system for your ultra-fine grinding and classifying requirements. *Write today.*



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Laboratory test-micronizing of your own material, or production micronizing on contract basis, are part of Sturtevant service. See for yourself the improvement ultra-fine grinding can contribute to your product. Or, if you have limited requirements for ultra-fine grinding, Sturtevant's contract micronizing service may be the economical answer. Write for full details.

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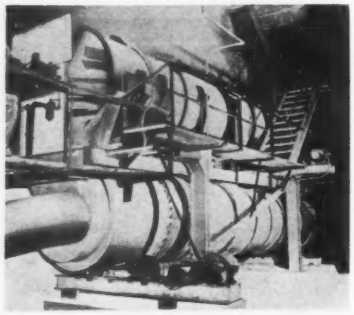
CENTRAL CHEMICAL CORP. GETS GRANULATION UNIT



Central Chemical Corp. of Hagerstown, Md., has announced installation of a Blue Valley Granulation Unit by Blue Valley Equipt. Mfg. and Engineering Co. The unit was added to their present mixing and ammoniation process.

Shown above are the new dryer-granulator and cooler drums. Mixing, ammoniation and screening parts of the equipment are not pictured.

SWIFT'S PLANT FOOD DIV. SAFETY RECORD

An outstanding safety record was made by Swift & Co.'s Plant Food Div. during the first three months of their 1957 fiscal year, according to information furnished the National Safety Council by Robert E. Kelly, Safety & Benefits Div. of Swift & Co.

In 27 plants working 873,696 manhours, there were no disabling injuries. This accident frequency rate of zero compares with 9.50 reported for a similar period in 1956.

IMC TO MINE POTASH IN SASKATCHEWAN

International Minerals & Chemical Corp. revealed recently that it would start immediately sinking a shaft for a new potash mine in the Canadian province of Saskatchewan.

The site is on 450,000 acres which International controls under permits near Esterhazy, about 150 miles east of the provincial capital of Regina.

Louis Ware, president of IMC and its subsidiary, International Minerals and Chemical Corp., (Canada) Ltd., said that the company's potash mine in Carlsbad, N. M. has been operating at capacity in recent years supplying about 20 per cent of the potash products used in the United States. He said that the new Canadian project will take care of the company's expanding business.

The Canadian ore has been thoroughly drilled and has proved of higher grade than that in New Mexico, Ware said. He reported that the area contains ample reserves for a mine that will produce at more than twice the rate of IMC's Carlsbad mine.

DOW MATCHES EMPLOYEES EDUCATION CONTRIBUTIONS

A new matching grant program of aid to higher education has been announced by The Dow Chemical Co.

Effective July 1, Dow will match its employees' contributions to educational institutions up to $100 a year per employee.

In addition, the company said it will make about $300,000 in other funds available to education for the 1957–58 academic year as part of its continuing aid-to-education program.

UNRESTRICTED AID GIVEN COLLEGES BY HERCULES

For the second consecutive year Hercules Powder Co. is giving unrestricted grants-in-aid to a number of American colleges and universities—with the 1957 scholarship program totaling about $100,000 to be distributed among some 26 schools.

These unrestricted grants-in-aid are in addition to grants of various kinds for specific purposes made by the company to institutions of higher education.

NATIONAL POTASH MINE IS CLOSED BY STRIKE

National Potash Co.'s Carlsbad, N. M., mine was closed beginning June 3 by a strike of members of the United Stone and Allied Products Workers of America (AFL-CIO).

The company said that the strike was the result of failure to reach agreement on certain non-economic matters. Management was unable to predict the duration of the strike.

NEW OFFICE FOR OM

The Plant Food Div. of Olin Mathieson Chemical Corp. has opened an area headquarters office at 426 North High St., Columbus. The office will be managed by Charles A. Wood of Kingston, Ohio, East Central sales manager.

IMC HONORED FOR AD CAMPAIGN

International Minerals and Chemical Corp. was honored at the recent 15th annual Chicago Federated Advertising Club Award dinner for the "best farm paper product-selling campaign in color." J. C. O'Brien, president of CFAC, presents citation to Frank O'Neill, IMC ad manager and William T. Dible, product sales manager for the Potash Div. of IMC.

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- **Rigid control from raw materials to finished products insure constant uniformity.**
- **Extreme care in loading and shipping in clean cars assure you of high purity on delivery.**

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FARM CHEMICALS

Business & Management

AMMONIUM NITRATE SAFETY HAZARD

The National Plant Food Institute has issued this precautionary warning concerning hazards involved in using ammonium nitrate solutions in mixed goods:

"The following is a precautionary warning to all mixers using large quantities of ammonium nitrate solutions in formulation of mixed goods along with substantial amounts of 66° Be sulfuric acid. Swift & Co. has found evidence that large, hot lumps which occasionally form and discharge from the mixer may be extremely dangerous if allowed to go into the piled mixed goods without being cooled.

"A recent unscheduled shutdown during production of a 12-12-12 grade with 421 pounds of nitrogen solution and 256 pounds of 66° Be (93 per cent) sulfuric acid and 33 pounds of anhydrous ammonia per ton of mixed goods necessitated dumping the mixer contents on to a separate pile immediately after shutdown and, therefore, by-passed the normal cooling operation. This small pile soon began to evolve dense white fumes and gave evidence of spontaneously reacting throughout the entire mass. A temperature check indicated the heat generation had brought portions of the pile up to over 500° F. The reaction was brought under control in about 30 minutes after the pile had been thoroughly broken up, spread with dolomite and flooded with water.

"A recheck of operations, after starting up, indicated that occasionally a few lumps would come out of the mixer which were extremely hot and evolving white dense fumes. A coarse grid was installed at the mixer discharge to separate these from the freshly mixed goods going to the cooler.

"Laboratory studies were then carried out which indicated that fertilizer salts promote the rapid breakdown of ammonium nitrate when heated. Such mixtures, when heated to 420° F., begin a slow decomposition of the ammonium nitrate which eventually is destroyed. Moreover, when a mixture contains about six per cent or more of ammonium nitrate and is heated to 450° F., the breakdown becomes extremely rapid and is self-sustaining. A large temperature increase in the product results from this fast decomposition. Hence, in order to avoid the possibility of generating a self-sustaining reaction within a pile of freshly made goods, it is evident that no extremely high temperature lumps should ever be allowed to become submerged in mixed goods with a large percentage of ammonium nitrate. Conservative calculations indicate that a six inch diameter lump which has undergone the spontaneous reaction requires a minimum of 10 minutes to cool to 400° F. on exposure to usual ambient air flow in rotary coolers.

"This experience at Swift & Co. and its laboratory studies emphasize that (1) no large, hot lumps of high solution mixtures should ever be allowed to reach the storage pile, (2) solution, acid and dry solids fed to the mixer should be kept within reasonable balance at all times, (3) localized over-heating in the mixers should be avoided, (4) large, hot lumps must be diverted by grids to prevent them from reaching the storage section, and (5) temperature levels above 450° F. can initiate a dangerous spontaneous reaction in fertilizer mixtures having six per cent or more ammonium nitrate."

W. J. HAUDE TO HEAD GRACE CHEMICAL CO.

William J. Haude has been appointed president of Grace Chemical Co. Div. Since May, 1955, he has been vice president and general manager of the division, located in Memphis, Tenn.

Before joining the Grace organization in 1953, Haude was president of Pittsburgh Agricultural Chemical Co., and prior to that was a vice president of John Powell & Co.

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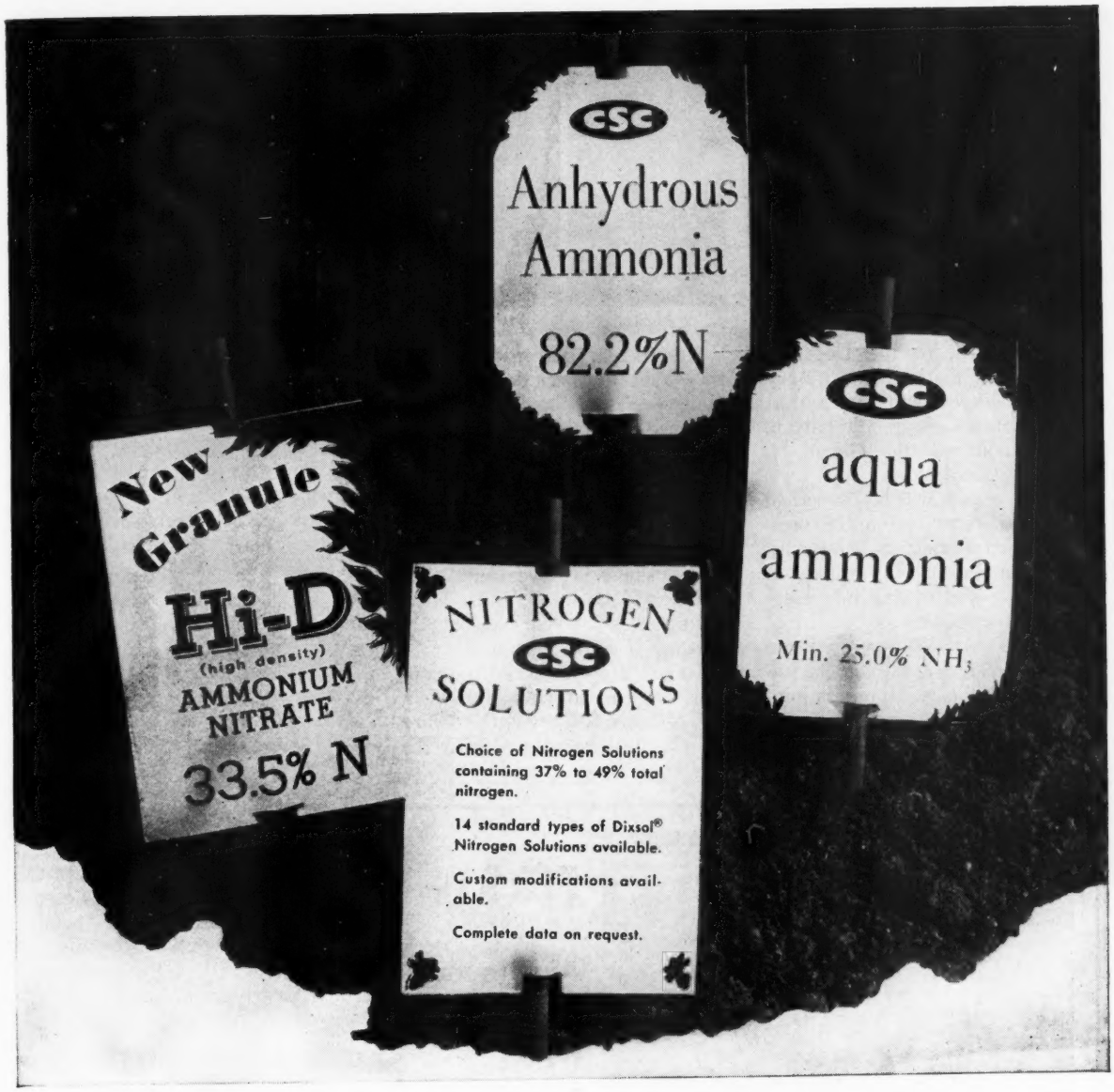

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Many leading fertilizer manufacturers, with a wide choice of quality supply, select CSC on the basis of thoroughly dependable supply and consistently prompt delivery. Pick up the phone, call one of the numbers listed—and see what service really means at CSC.

Call one of these numbers:

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COMMERCIAL SOLVENTS CORPORATION

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NITROGEN the *heart* of the harvest

FARM CHEMICALS

Business & Management

KANSAS STATE RECEIVES RESEARCH GRANT FROM DA

Research at Kansas State College on use of fumigants to control insects attacking stored grains will be furthered with a $7,500 grant from Diamond Alkali Co.

The award, to the Dept. of Entomology of the Kansas Agricultural Experiment Station at Kansas State College, Manhattan, was announced by Glenn H. Beck, station director.

The research will be concerned with new combinations of presently used fumigants, and with new formulations. Methods of evaluating and testing fungicides also will be studied.

Donald A. Wilbur, K-State entomologist, will direct the research. Phillip K. Harein is joining the staff to work on the project.

OLDEST FERTILIZER DEALER IN U. S. IS 91

Hilfiker

Hardwick

Results of a contest held to find the oldest fertilizer dealer in the United States have been announced by the editors of "TFD," a publication of Spencer Chemical Co.

The contest winner, who still helps operate a 90-acre farm in addition to conducting his fertilizer business, is 91-year-old W. F. Hilfiker of Portland, Ind. Runner-up was 88-year-old W. F. Haenke of Gilbert, Minn.

In another division of the contest, 75-year-old Dan Hardwick, Sr., of Loris, S. C., won the award for the fertilizer dealer with the most years of service. He has been in the plant food business continuously since 1897. George F. Voelker, Evansville, Ind., a fertilizer dealer for 59 years, was second high man in this division.

The four top men, who had an average age of 83 and had been in business an average of 57 years, will receive engraved plaques from the Spencer magazine.

AMERICAN POTASH & CHEM. STARTS SAFETY CONTEST

A company-wide safety contest has been inaugurated by American Potash & Chemical Corp. in which AP&CC facilities will compete for a newly-established President's Trophy.

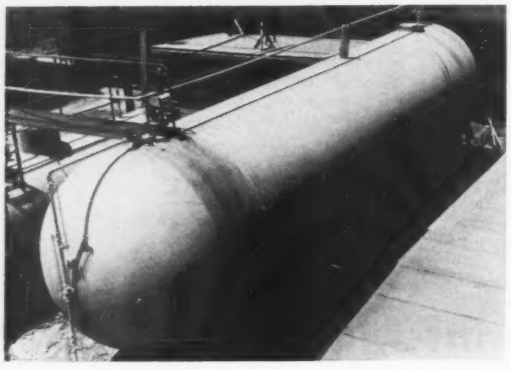
The contest will be conducted on a quarterly basis among AP&CC facilities at Los Angeles, Trona and Whittier, Calif., San Antonio, Tex. and Henderson, Nev., with the winner being presented the President's Trophy, a handsome bronze and walnut plaque. Judging will be done on a point system, to permit equal competition between large and small facilities.

Commenting on establishment of the trophy, President Peter Colefax said AP&CC will "bend every effort to continue the safety records established by company employees in recent years."

CALSPRAY WINS SAFETY AWARD AT MCA MEETING

Two chemical companies were presented with the Lammot duPont Safety Award Plaque at the 85th annual meeting of the Manufacturing Chemists' Association, held last month at White Sulphur Springs, W. Va. The awards are made annually to the chemical companies showing the greatest improvement in plant safety over a five-year period.

Winner among those companies whose employees worked more than 2 million man-hours annually was California Spray-Chemical Corp. Among firms whose workers put in 2 million man-hours or less yearly, the award was presented to Patent Chemicals, Inc.



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• COLE was first to build welded aluminum tanks for nitrate solutions, just as we have always pioneered in supplying the plant food industry with tanks or equipment for the storage or processing of agricultural chemicals. . . . Send us your inquiries for conventional or special design tanks—shop built up or field erected, using flat, flanged and dished, or hemispherical heads. Write for a copy of *Tanks and Equipment for the Plant Food Industry.*

R. D. COLE MANUFACTURING CO. COLE NEWNAN, GEORGIA

Elevated Tanks, Pressure Vessels, Chemical and Processing Equipment from Aluminum, Stainless and Carbon Steel, Monel and Other Alloys.

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BIG DAVE SAYS,

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GTS*

now guarantees you a 46% A.P.A. minimum!

*Granulated Triple Superphosphate

HIGH IN P_2O_5 CONTENT—Because it is constant in analysis its guaranteed minimum is 46% A.P.A.

UNEXCELLED QUALITY—Because of Davison's more than century of experience in fertilizer formulation DAVISON Granulated Triple Superphosphate is the standard by which all other granulated products are compared. It is guaranteed to satisfy you on every count.

EASY TO HANDLE—Because of its uniform particle size it spreads evenly and uniformly and is perfect for direct applications. Does not deteriorate in handling, packaging or storage.

IDEAL FOR FORMULATIONS—Because it is easy to blend. Excellent for alkaline goods and especially recommended for O-25-25.

"TRIPLE" IN SERVICE AND DELIVERY TOO—You get DAVISON GTS *when* you want it, *where* you want it, the *way* you want it.

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Division of W. R. Grace & Co.

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Producers of: Catalysts, Inorganic Acids, Superphosphates, Triple Superphosphates, Phosphate Rock, Silica Gels, Silicofluorides, Rare Earths and Thorium. Sole Producers of DAVCO® Granulated Fertilizers.

People

American Agr. Chemical Co. announces the death of John R. Scherm, vice president—fertilizer sales, on May 20 at his home in Upper Montclair, N. J.

AAC administrative changes: B. R. Richey was recently elected vice president; W. J. Turbeville, Jr., vice president—fertilizer sales; and D. S. Parham, vice president —production.

American Potash & Chemical Corp. has established a technical sales services section to act as coordinating unit among the company's production, market development and sales departments. W. J. F. Francis, AP&CC vice president in charge of sales, said the newly formed section would be part of the sales department, but would provide liaison on technical matters to the various departments.

Lundy

Wendt

Daniel A. Lundy, formerly western sales supervisor of boron and lithium products, will be western manager of the new section, while Nelson E. Wendt, previously head of northeastern sales, will be eastern manager. Lundy and Wendt will operate from the company's Los Angeles and New York offices respectively.

Also announced was appointment of Robert P. Rice as chief control chemist at AP&CC's Henderson, Nev., plant, and that of E. Robert Little, Jr., as sales representative assigned to the San Francisco district office.

American Chemical Paint Co. Jack P. Taylor has been promoted to manager of industrial chemical sales, a newly created position in the Agricultural Chemicals Div. He was previously assistant to the sales manager of the same division, M. B. Turner, and specialized in industrial brush control chemicals.

Taylor

California Spray-Chemical Corp. Appointment of Stanford

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BRADLEY HERCULES MILLS

From rough to finish . . .
in one low-cost operation

Constant progress in design and manufacture over the past 50 years has made Bradley Hercules Mills the standard pulverizer where a superior agricultural limestone product is desired. Automatic electrical feed control eliminates manual operation. Rugged, dustless construction, maximum accessibility keep maintenance costs at an absolute minimum. In sizes to meet the requirements of most any plant at moderate cost.

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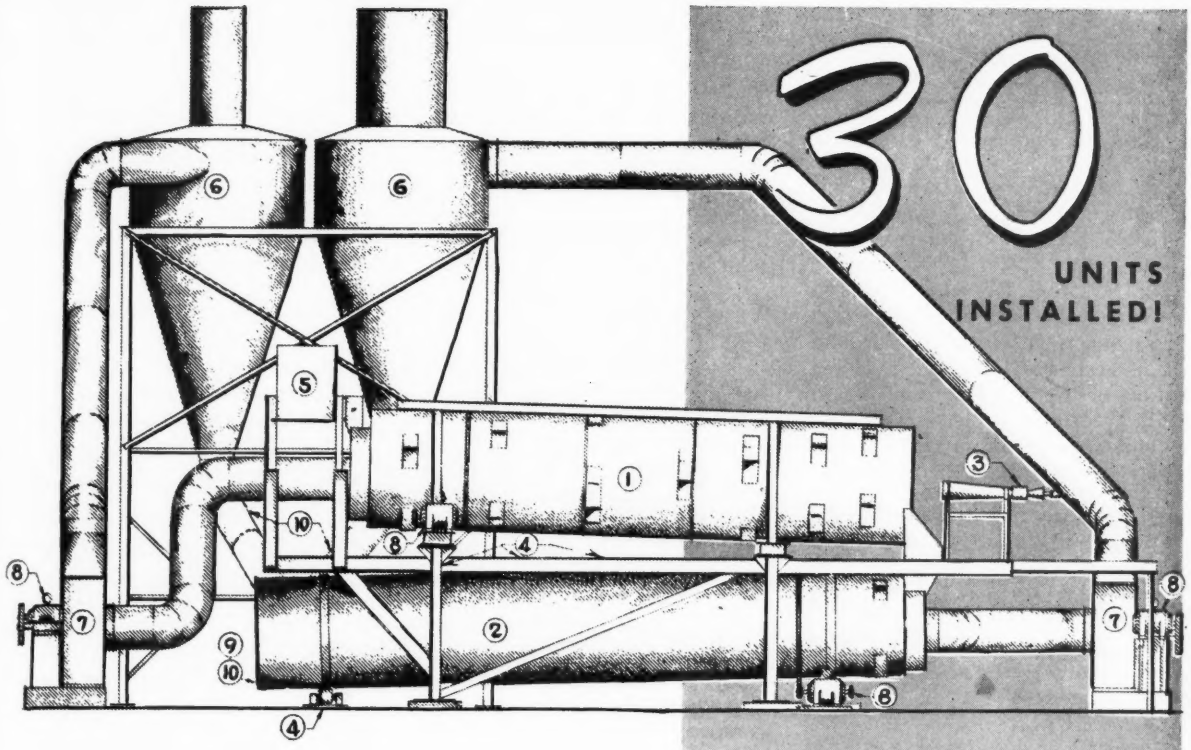
LONDON ALLENTOWN, PENNA. BOSTON



30 UNITS INSTALLED!

The 30th Blue Valley Granulation Unit just installed, proves that more fertilizer plant owners wanting quality granular fertilizer at the lowest cost . . . are choosing—

HERE'S WHY BLUE VALLEY IS THE GRANULATOR LEADER!

1. **DRYER DRUM, HEAVY STEEL SHELL** of all-welded construction. Countercurrent air and heat flow controls liquid phase, providing **maximum granulation with less recycle; drying at lower temperatures —lower fuel requirements per ton.**
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3. **BURNERS AND SUPPORT FRAME**—Granulate using either gas, oil, or L.P. fuel.
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6. **CYCLONE-TYPE DUST COLLECTORS**—Large, rugged, cyclones specially engineered for fertilizer plant operations.
7. **HIGH VOLUME FAN VELOCITY**—Especially engineered for fertilizer plant operations.
8. **INDUSTRIAL MOTORS**—Either drip-proof or enclosed, fan-cooled as desired. **Lower horsepower requirements.**
9. **GRANULATED PRODUCT**—Double screening necessary only when special sizing required.
10. **MINIMUM RECYCLE:** From screen and cyclone returned to mixer or ammoniator.

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THE BLUE V GRANULATOR

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TOPEKA, KANSAS

FARM CHEMICALS *People*

A. Allen as president of Insecticidas Ortho, S. A., Mexican affiliate of Calspray, was recently announced.

Dr. Lowell G. Nelson has been named a Calspray district agronomist. He joined the Portland research staff on June 1, filling one of the new positions created by continued expansion of Calspray's fertilizer program in the Pacific Northwest.

Commercial Solvents Corp. Rudolph DiGiacomo has been added to the staff of the market development department. With headquarters at the company's New York City general offices, DiGiacomo has been assigned as a field representative in the East.

DiGiacomo

Cornell Univ. Agricultural Experiment Station. Dr. Charles E. Palm, head of the Dept. of Entomology and Limnology at Cornell, has been named director of the experiment station and director of research for the New York State Colleges of Agriculture and Home Economics. He succeeds Dr. C. E. F. Guterman who died March 27.

Diamond Alkali Co. Appointment of Herbert H. Harris of Winona, Minn., to the technical service staff of the Chlorinated Products Div. is announced by L. Gordon Utter, manager of technical service. He will be located in the Diamond Research Center in Painesville, O.

Harris

Diamond Black Leaf Co. Harold S. McCormick, Jr. joins DBL as a sales representative for tobacco stems to the fertilizer and poultry industries. He goes to the company from United States Overseas Corp. From 1955 to September, 1956, McCormick was with Sohio Chemical Co.

Escambia Chemical Corp. John B. Clopton joins the firm to engage in commercial development and the sale of ammonia products and methanol. Formerly with the Plastics Div. of Monsanto Chemical Co. at Texas City, Tex., Clopton will locate at Escambia's New York City headquarters.

Clopton

Dr. L. H. Sutherland has been appointed section head in the company's research program. He will have charge of the analytical and certain of the process groups, dividing his activities between Cambridge and Newton, Mass.

Fairfield Chemical Div., Food Machinery & Chemical Corp. R. "Larry" Brett has been named district manager for the Chicago office. The company reports Brett has been active in the industry for a number of years, and has served on the Scientific Committee for the Chemical Specialties Manufacturers' Association.

Hercules Powder Co. Robert W. Crabtree, manager of nitrogen product sales in the company's Explosives Dept., has been named manager of chemical sales, a newly created post in that department.

International Minerals & Chemical Corp. Thomas M. Ware, administrative vice president, has been elected a director of the company. He fills the vacancy created by retirement of David M. Milton, who served on the board for the past 15 years.

The board also elected Dr. Milton LeBaron vice president in charge of research; William Bellano, vice president in charge of engineering and Anthony E. Cascino, vice president in charge of marketing.

Lion Oil Co. Div. of Monsanto Chemical Co. On June 1, A. F. Reed relinquished his duties as Lion's director of sales to become an assistant in sales matters to executives of both Lion and the Inorganic Chemicals Div. of Monsanto. Reed will continue as a Lion vice president, with headquarters in El Dorado.

J. H. Sheehan, vice president of the Lion Division, on the same date assumed responsibility for Lion's Petroleum product sales.

Wilson & Geo. Meyer & Co., Intermountain. Promotion of Thomas R. Cushing to sales manager, with headquarters in Salt Lake City, is announced by Ralph S. Waltz, vice president.

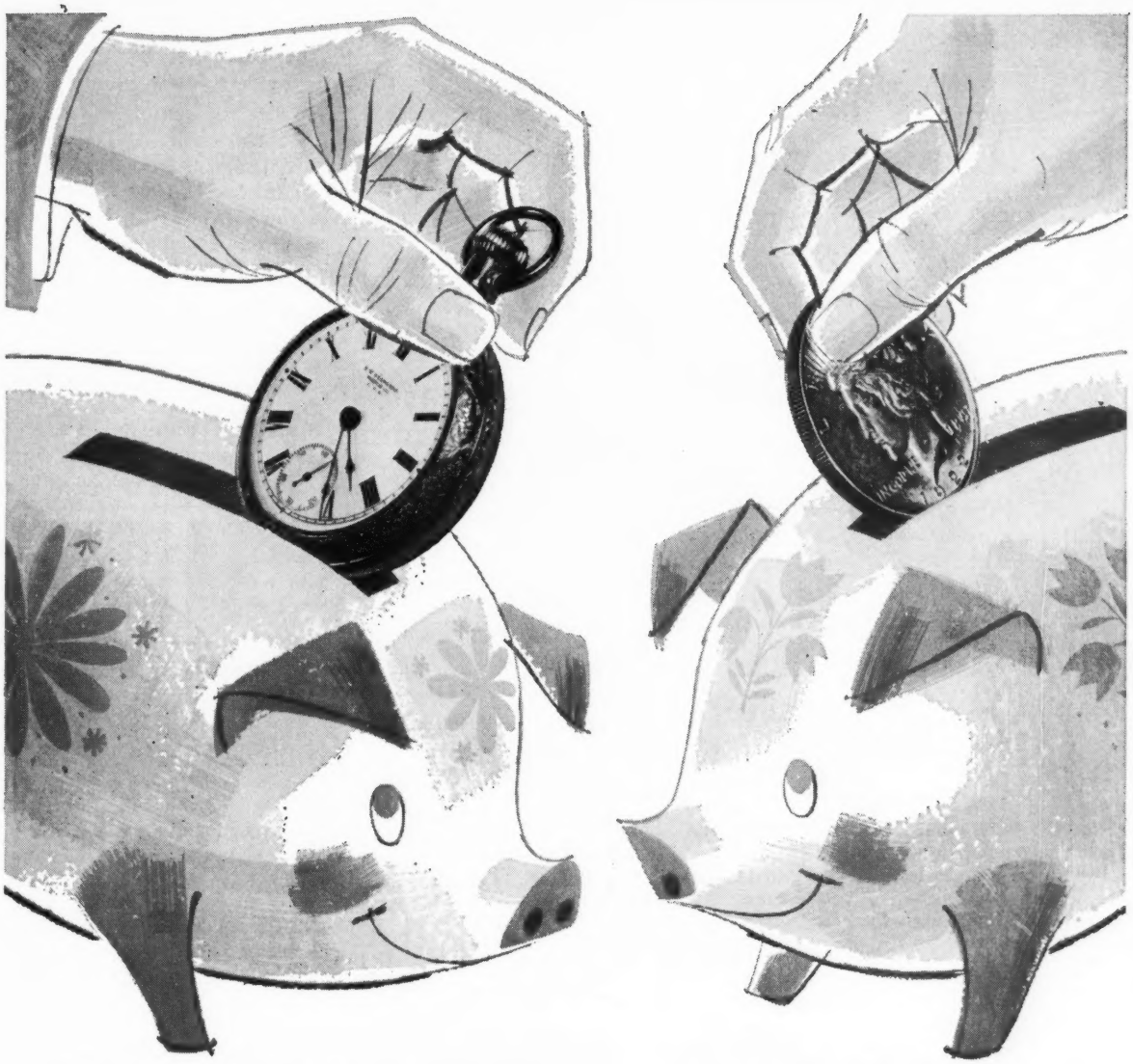
Olin Mathieson Chemical Corp. Formation of Olin Mathieson International Corp. and appointment of Henry A. Arnold as its president has been announced by Thomas S. Nichols. The new company is a wholly owned subsidiary. Before his new appointment, Arnold had been vice president of Olin Mathieson in charge of its South American operations and was also president and managing director of E. R. Squibb & Sons, Argentina, S.A.

Arnold

Samuel L. Nevins, Olin Mathieson vice president, was elected a member of the National Committee on Boys and Girls Club Work at the annual meeting held recently in Chicago.

Nevins

The National Committee, with headquarters in Chicago, is a volunteer organization of public-spirited citizens whose purpose is to enhance and expand 4-H educational work.



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There are two big reasons why you should sign now with Sinclair for your supplies of nitrogen solutions, anhydrous ammonia and aqua ammonia.

First – the completion and opening of a centrally-situated new plant in Hammond, Indiana, means substantial savings in delivery time and shipping costs for most Mid-West nitrogen users.

Second – your seasonal supply problem can be solved by this plant's vast storage capacity . . . products will be delivered when you need them to meet your production schedule.

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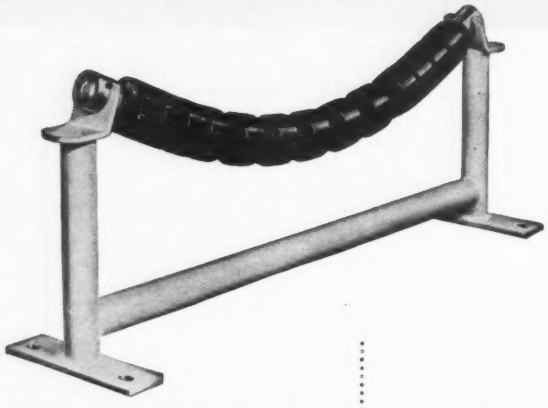
We've been asked...

"WHAT IS THE JOY LIMBEROLLER BELT CONVEYOR IDLER?"



JOY LIMBEROLLER BELT CONVEYOR IDLER

CONVENTIONAL IDLER

Radically different from all other idlers, the Limberoller is a flexible steel cable suspended between two bearings... to which neoprene discs are molded ... forming a single roll idler which turns on its own axis. This imparts a flexing action which is self-cleaning . . . prevents material buildup, a source of trouble with conventional idlers.

Supports the belt throughout its entire width... doesn't have the unsupported gaps left between the rolls like conventional idlers. Increases belt life 20% and more. Materials don't "bump along" from idler to idler, either.

Two bearings, instead of six. They are up out of the dirt zone, not hiding down under the belt. Joy has never replaced a single bearing due to normal failure. Heard enough? There's more . . . get the whole story from ***Joy Manufacturing Company, Oliver Building, Pittsburgh 22, Pa.*** In Canada: *Joy Manufacturing Company (Canada) Limited, Galt, Ontario.*

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FARM CHEMICALS People

Pacific Coast Borax Co. Div., U. S. Borax & Chemical Corp. has appointed Jay B. Ford, Jr., as assistant general manager.

Roy Riegels Chemical Co. H. Walton Arrowsmith, who has been in the farm chemicals business for 32 years, is reported to have retired because of ill health.

Sinclair Chemicals, Inc. announces appointment of Anthony G. Grady as national accounts

Anderson

Grady

representative and Benjamin T. Anderson as technical service engineer.

Stauffer Chemical Co. C. D. Julien has been named as assistant to the eastern sales manager, Agricultural Chemicals Div. He will locate at Stauffer's eastern headquarters in New York.

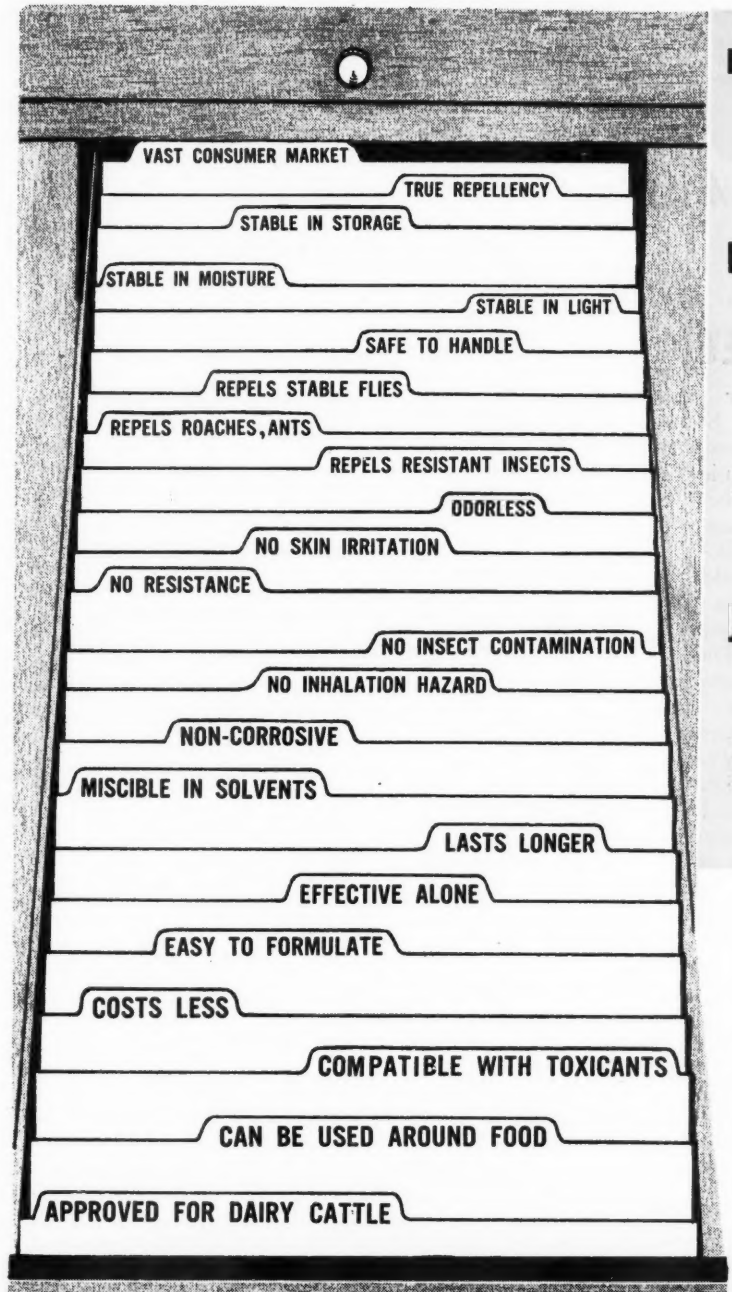
Robert R. Obrecht has been named director of Stauffer's Richmond, Calif., research laboratory.

Velsicol Chemical Corp. has promoted Elwood W. Phares to the position of manager—marketing and commercial development

Phares

Schumaker

and George K. Schumaker to manager, Northeastern Region, Agricultural Chemicals Div.



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that can be the most profitable information in your files!

TABUTREX has given "insect repellency" an entirely new meaning. Now, for the first time, it is possible to meet the vast consumer demand for a SAFE, ECONOMICAL, TRULY EFFECTIVE fly, roach and ant repellent.

TABUTREX has been approved for use on dairy cattle.

TABUTREX builds a barrier against house flies, biting flies, roaches and ants.

TABUTREX repels even resistant flies and roaches... they just can't stand it (Humans and animals don't even notice it.)

TABUTREX is compatible with toxicants, but can also stand squarely alone. Soluble in oil... emulsifiable in water.

TABUTREX with it's 23 proven advantages is certain to become one of your most important, most valuable, most profitable insect-control tools.

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Please rush me all important data on TABUTREX insect repellent.

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City Zone State

Type of Business
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CHEMISTS STUDY NEW METHODS AT PURDUE

FIFTY fertilizer industry and state control chemists, who met at Purdue University, May 17 and 18, made a first-hand study of the merits of two new chemical analysis methods important to the fertilizer industry. The program was sponsored jointly by the Chemical Control Committee of the National Plant Food Institute and the University's Biochemical Dept.

The two-day school on chemical analysis was organized by Drs. E. D. Schall and F. W. Quackenbush of Purdue and Vincent Sauchelli, chairman of the Institute's Chemical Control Committee. Thirty-five chemists from the fertilizer industry and 15 from state control laboratories were in attendance.

Numerous methods are available to chemists for the determination of potassium in fertilizers and potash materials, among which the flame photometric and the chloroplatinate methods are widely used. Although the flame photometric has not yet been approved officially by the Association of Official Agricultural Chemists, it is very rapid and useful where the potassium content is known to be small. The chloroplatinate method, officially approved, is a gravimetric method and is time consuming and expensive to carry through. The new method demonstrated at the Purdue school is of the volumetric type. It is less expensive and compares favorably with the flame photometric method in speed and with the gravimetric method in accuracy, the Institute reports.

One of the purposes of the school was to familiarize the fertilizer chemical analysts with the procedures so that when a collaborative study on the method is later organized, the participants will be able to follow the procedures much more uniformly than is customarily the case.

The official method for determining nitrate nitrogen in the presence of a high content of chlorides has been criticized because nitrogen losses occur which penalize the manufacturer. New, modified procedures have been developed by several investigators.

Purdue University's Biochemistry Dept. demonstrated its modified procedure at the school. The attending chemists had the opportunity to analyze a sample by the new procedure which is known as the reduced iron method. Loss of nitrogen by the official method occurs when the concentration of the chloride ion exceeds that of the nitrate ion; the proposed reduced iron method prevents such loss. A collaborative study on this method is also being organized.

The Institute Chemical Control Committee is collaborating with Drs. Schall and Quackenbush of Purdue in the organization of the study in which both industry and state control chemists will participate. It is hoped that the results will be available for presentation to the annual meeting of the Association of Official Agricultural Chemists this coming October and that, at least, a tentative approval of the two new procedures will be given at that time.

MCA ELECTS OFFICERS

Ernest Hart, president of Food Machinery and Chemical Corp., has been elected chairman of the board of directors of the Manufacturing Chemists' Association.

Harry B. McClure, vice president of Union Carbide Corp., was elected chairman of the executive committee. R. L. Murray, chairman of the board of Hooker Electrochemical Co., and D. S. Frederick, vice president of Rohm & Haas Co., were named vice presidents.

General J. E. Hull, USA (Ret.), full time president and a director, and M. F. Crass, Jr., full-time secretary-treasurer, were re-elected.

WESTERN AG CHEM ASSN. WILL MEET IN OCTOBER

The Villa Hotel, in San Mateo, Calif., will be the site for the fall meeting of the Western Agricultural Chemicals Association, October 7–8, according to C. O. Barnard, executive secretary.

Nematodes and the application of nematocides will be discussed by Dr. M. W. Allen, Dept. of Nematology, Univ. of California. William A. Harvey, weed control specialist, Extension Service, Univ. of California, will explore some economic aspects of the control of unwanted vegetation. Also scheduled to speak is Allen B. Lemmon, chief of the Bureau of Plant Industry, Calif. Dept. of Agriculture.

The speeches are to be delivered after luncheon October 8. Prior sessions will be devoted to association business.

AAFCO TO CONVENE IN WASHINGTON, D. C.

B. D. Cloaninger, secretary-treasurer of the Association of American Fertilizer Control Officials, has announced that industry members and other interested workers are cordially invited to attend the AAFCO meeting October 18 at the Shoreham Hotel, Washington, D. C.

LOUIS WILSON HONORED AS 'FRIEND OF 4-H'

Louis H. Wilson, secretary and director of information of the National Plant Food Institute, was one of ten "Friends of 4-H," honored during the 27th National 4-H Conference in Washington, D. C., June 15–21 for his "outstanding contributions to the nation-wide development of the 4-H Club Program."

With the other nine honored, Wilson received an engraved plaque in a citation ceremony during the afternoon conference assembly on June 19.

CINCINNATI MEETING SCHEDULED BY NFSA

The National Fertilizer Solutions Association will hold its 1957 convention at the Netherland-Hilton Hotel in Cincinnati, Ohio, November 17 to 19, reports Executive Secretary Muriel F. Collie.

A new feature for the convention is establishment of Supplier Conference Rooms in place of the usual trade show, where suppliers will set up display boards, show samples, distribute literature and enjoy privacy, informality and comfort while conferring with their customers.

A General Session on Standards is scheduled for Sunday morning, Nov. 17. This discussion session is being planned by the association's Standards Committee, chairman of which is Roy F. Broyhill of The Broyhill Co. Committee members are W. Harold Schelm, Schelm Bros., Inc. and Donald R. Weber, Spraying Systems Co. At this session, it is expected that a program of standardization will be developed for such items as tank fittings, size designations for all nozzles, etc.

General sessions will be held Monday morning and Tuesday morning and afternoon. Topics of speeches include "Selling and Customer Relations"; "Material Supply Outlook"; "Local Consumer Meetings"; "Essentials to Success"; and "Additives to Fertilizer Solutions."

The annual banquet is scheduled for Tuesday evening, Nov. 19, following which the Supplier Conference Rooms will be open for a two-hour period to close the convention.

Ernest M. Harper, Nitrogen Division, Allied Chemical & Dye Corp., is chairman of the 1957 Convention Planning Committee. Serving with him are William G. Calvert, Lafayette Farm Supply, Inc.; Ralph Helmstatter, H&R Agricultural Service; John Ackley, John Deere Planter Works; O. L. Ohnstad, Ohio Fertilizer, Inc. and President E. E. Crouse.

THIS symbol stands for high-grade coarse and uniform Muriate of Potash (60% K_2O minimum). Southwest Potash Corporation provides a dependable supply of HIGH-K* Muriate for the plant food industry.

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TRIPLE SUPERPHOSPHATE

Fine Texture, Small Particle Size For Maximum Ammoniation-Granulation

U. S. Phosphoric Products Triple Superphosphate is milled and Screened to a consistantly uniform fine texture that produces faster and more thorough agglomeration in your fertilizer processing. Small particle size, rigid chemical structure control and natural air curing is your assurance of a Triple Superphosphate that produces maximum ammoniation in a minimum of time. 46% available P_2O_5. Pre-shipping conditioned to arrive at your plant ready for immediate inclusion into your processing.

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Through Six Basic Chemical and Physical Analysis

HIGH WATER SOLUBILITY
High Water Solubility is a Characteristic of all 3 Grades

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Fine Texture, Highest Porosity, Large Surface Area, Small Particle Size, for Maximum Ammoniation-Granulation

GRANULAR
Dust Free, Free Flowing, Uniform Particle Size, Medium Hardness, No Bridging Over, for Direct Soil Application

COARSE
For Intermediate Ammoniation to Produce a Semi-Granular Product. Also Affords Excellent Compatible Mixing with Granular Potash, for Minimum Segregation, in Alkaline Grades.

There's a BRADLEY & BAKER office near you. Their representative would be pleased to consult with you on your requirements and to advise on your most convenient delivery routings.

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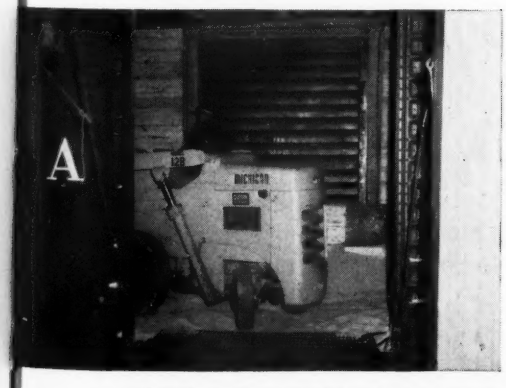
Power-shifting makes this tractor shovel (a Michigan)
faster and more maneuverable in boxcars

If you've ever tried to shift gears and turn a corner at the same time, you'll understand why the job-proved Michigan Model 12B is faster and more maneuverable in tight quarters. You don't have to stop to shift the Model 12B. Without taking your left hand from the wheel, you simply push the single power-shift lever to High, Low or Reverse. Clark's exclusive power-shift transmission and torque converter eliminate clutch pedal and engine clutch. You have no reaching, no gear clash, no hesitation. You save seconds, even minutes, on every cycle. And you eliminate downtime due to burned facings and other clutch troubles.



Fingertip steering, no-clutch direction changes, and full heaped loads help the Michigan Model 12B unload boxcars quickly. Standard bucket holds 16 cu ft, interchanges with 6, 10, 20 and 27 cu ft sizes, with lift fork, and tine bucket.

Dust protection

To cut downtime still further, oil bath air cleaner, filters and sealed assemblies protect the Model 12B against dust and dirt in every conceivable way. Take a first-hand look at this modern Tractor Shovel—clip the coupon to your letterhead and we'll arrange a demonstration in your own plant.

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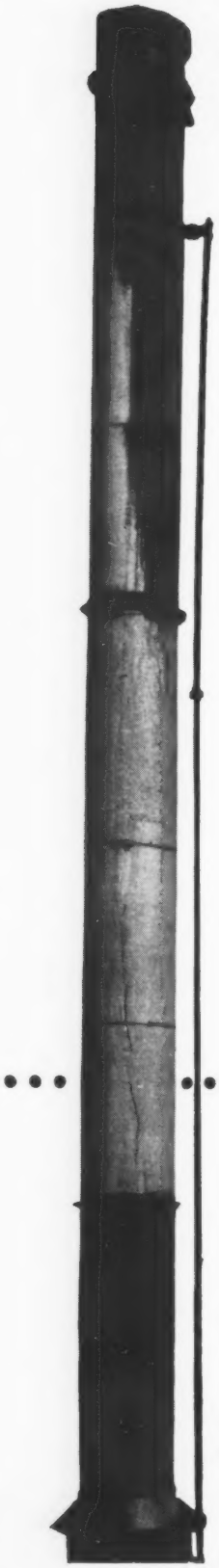

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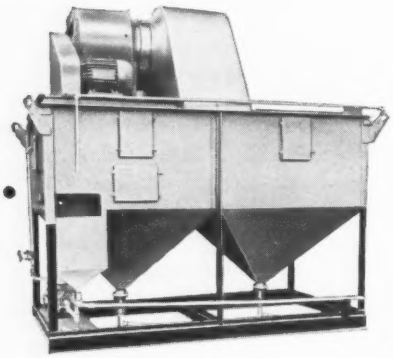
comparable efficiencies
in removal of sub-micron dust

These are actual operating figures for a battery of Johnson-March Type A Hydro Precipitator Scrubbers in daily use since Spring 1956 at a large rubber reclaiming plant.*

Dust concentration in stack discharge has been reduced to an insignificant 0.015 grain per cubic foot. Unpleasant odors and vaporized oils, which once fouled the atmosphere of the surrounding community, have been literally washed away. As a matter of fact, the Johnson-March Scrubbers have permitted the profitable use of recovered oils in the plant's processing operations.

If dust, fumes or odors are problem by-products of your plant, Johnson-March engineers can help you eliminate them. For a dust control survey of your operations, without obligation, call or write the Johnson-March office. Or send for Bulletin HP-955.

*Name on request.



New-model Type A Scrubbers have improved diffuser elements which produce more active gas-and-water turbulence . . . more effective precipitation of sub-micron dust.

Johnson March

DUST CONTROL ENGINEERS

1724 Chestnut Street, Philadelphia 3, Pa.

CALENDAR

July 10-14. Plant Food Producers of Eastern Canada Convention, Manoir Richelieu, Murray Bay, Que.

July 11-12. Great Plains Anhydrous Ammonia Meeting, Kansas State College, Manhattan.

July 17-19. Southwestern Fert. Conf. and Grade Hearing, Galvaz Hotel, Galveston, Tex.

July 30-31. Fertilizer Meetings and Tour of Experiment Station, Auburn and Thorsby, Ala., sponsored by Ala. Soil Fertility Society and Ala. Agr. Experiment Station.

Aug. 13-14. Ohio Pesticide Institute Annual Summer Meeting, Ohio Agr. Experiment Station, Wooster.

Aug. 14. Conn. Agr. Experiment Station Field Day, Mt. Carmel, Conn.

Sept. 4-6. Annual Meeting, National Agricultural Chemicals Assn., Essex & Sussex, Spring Lake, N. J.

Sept. 5-6. Great Lakes States Anhydrous Ammonia Meeting, Michigan State Univ., East Lansing, Mich.

Sept. 8-15. International Congress of Crop Protection, Hamburg, Germany.

Sept. 11-13. Florida Entomological Society Annual Meeting, San Juan Hotel, Orlando, Fla.

Oct. 2-4. Annual Beltwide Cotton Mechanization Conference, Shreveport, La.

Oct. 3-5. Pacific Northwest Plant Food Assn. Annual Convention, Sun Valley, Idaho.

Oct. 7-8. Western Agricultural Chemicals Assn. Fall Meeting, Villa Hotel, San Mateo, Calif.

Oct. 14. Sixth Annual Sales Clinic, Salesmen's Association of the American Chemical Industry, Hotel Roosevelt, New York City.

Oct. 17. Conference on Chemical Control Procedures, Shoreham Hotel, Washington, D. C. Sponsored by the National Plant Food Institute.

Oct. 17 (8 p.m. States Relations Committee) & **18,** The Assn. of American Fertilizer Control Officials, Shoreham Hotel, Washington, D. C.

Oct. 29-31. Entomological Society of Canada and Entomological Society of Alberta Annual Meetings, Lethbridge, Alb.

Nov. 3-5. 34th Annual Convention, California Fertilizer Association, St. Francis Hotel, San Francisco.

Nov. 6-8. Fertilizer Industry Round Table, Sheraton Park Hotel, Washington, D. C.

Nov. 17-19. Annual Convention, National Fertilizer Solutions Assn., Netherland-Hilton Hotel, Cincinnati.

Dec. 2-5. Fifth Annual Meeting, Entomological Society of America, Hotel Peabody, Memphis, Tenn.

Dec. 11-13. Agricultural Ammonia Institute Annual Meeting, Hotel Marion, Little Rock, Arkansas.

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Company, Phosphates Department,
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. . . or Brewster, Florida.

PENALTY RATE FOR EXCESS WHEAT ANNOUNCED

A marketing quota penalty rate of $1.12 per bushel on "excess" wheat of the 1957 crop was recently announced by USDA.

As directed by law, the rate of the marketing quota penalty is 45 per cent of the parity price per bushel of wheat as of May 1 of the calendar year in which the crop is harvested.

Growers voted approval of marketing quotas for the 1957 wheat crop on July 20, 1956. When wheat marketing quotas are in effect, a farmer who does not comply with the wheat acreage allotment established for his farm and who harvests more than 15 acres of wheat is subject to a penalty on his farm marketing excess. The wheat crop from such a farm is also ineligible for price support.

FARMERS HOME ADM. LOANS INCREASE

Loans made and insured by the Farmers Home Administration during the nine months ended March 31 totaled $281,428,000, USDA has announced. This compares with $240,310,000 loaned and insured during the same period a year ago.

Farm operating loans made in the nine-month period totaled $162,865,000, compared with $125,840,000 last year. These funds were used to buy equipment, livestock, fertilizer, pesticides and to pay for other farm and home operating expenses.

ICA AUTHORIZATIONS

Bolivia. $50,000—agricultural pesticides (PA No. 11-236-99-H1-7001). Contract period: April 30 to Sept. 30. Source: World wide. Terminal delivery date: Dec. 31.

$50,000—nitrogenous fertilizers (Urea 45% N) (PA No. 11-230-99-H1-7002). Contract period: April 30 to Sept. 30. Source: World wide. Terminal delivery date: Dec. 31.

$100,000—fertilizers, phosphatic and/or mixed as required for fertilizing potatoes, corn, vegetables, truck crops, pasture and legume forages (PA No. 11-235-99-H1-7003). Contract period: April 30 to Sept. 30. Source: World wide. Terminal delivery date: Dec. 31.

Vietnam. $300,000—ammonium sulfate (PA No. 30-230-99-H9-7023). Contract period: April 30 to Sept. 30. Source: World wide. Terminal delivery date: Dec. 31.

Spray Nozzle Reference Data / Yours FOR THE ASKING

TEEJET SPRAY NOZZLES
with choice of over four hundred interchangeable orifice tips. Every type of spray pattern. Write for Catalog 30.

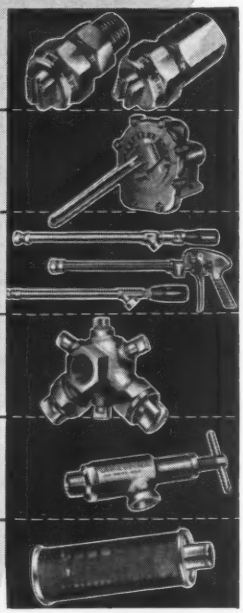
TEEVALVE
selector valve for booms with spray selection in shut-off position. Write for Bulletin 84.

GUNJET SPRAY GUNS
for pressures up to 800 p.s.i. Interchangeable tips for every use. Bulletins 65, 69 and 80.

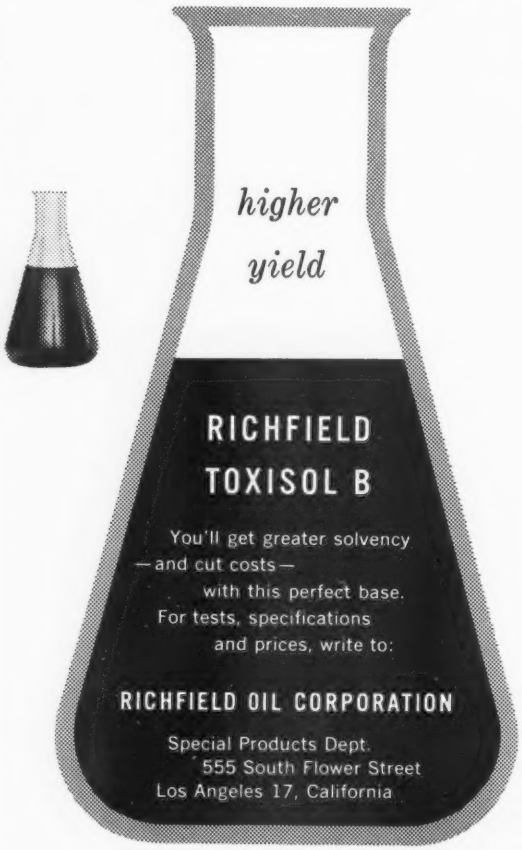
BOOMJET SPRAY NOZZLES
spray up to 66 feet wide for broadcast spraying with one nozzle. Bulletins 66 and 71.

PRESSURE RELIEF VALVES
dual spring assembly for low and high pressures... write for Bulletin 83.

SUCTION STRAINERS
withdraw liquid within 1" of drum bottom. Write for Bulletin 85.



AND FOR ACCESSORIES OF ALL KINDS—CATALOG 30.
SPRAYING SYSTEMS CO., 3280 Randolph St., Bellwood, Ill.



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- Speeds cleanup of mixing equipment by minimizing residual buildup!
- Mixes and coats evenly; isolates each fertilizer particle!
- Increases sales of your fertilizer by improving its drillability and reducing caking!
- Cuts wear on both mixing and farming machinery!

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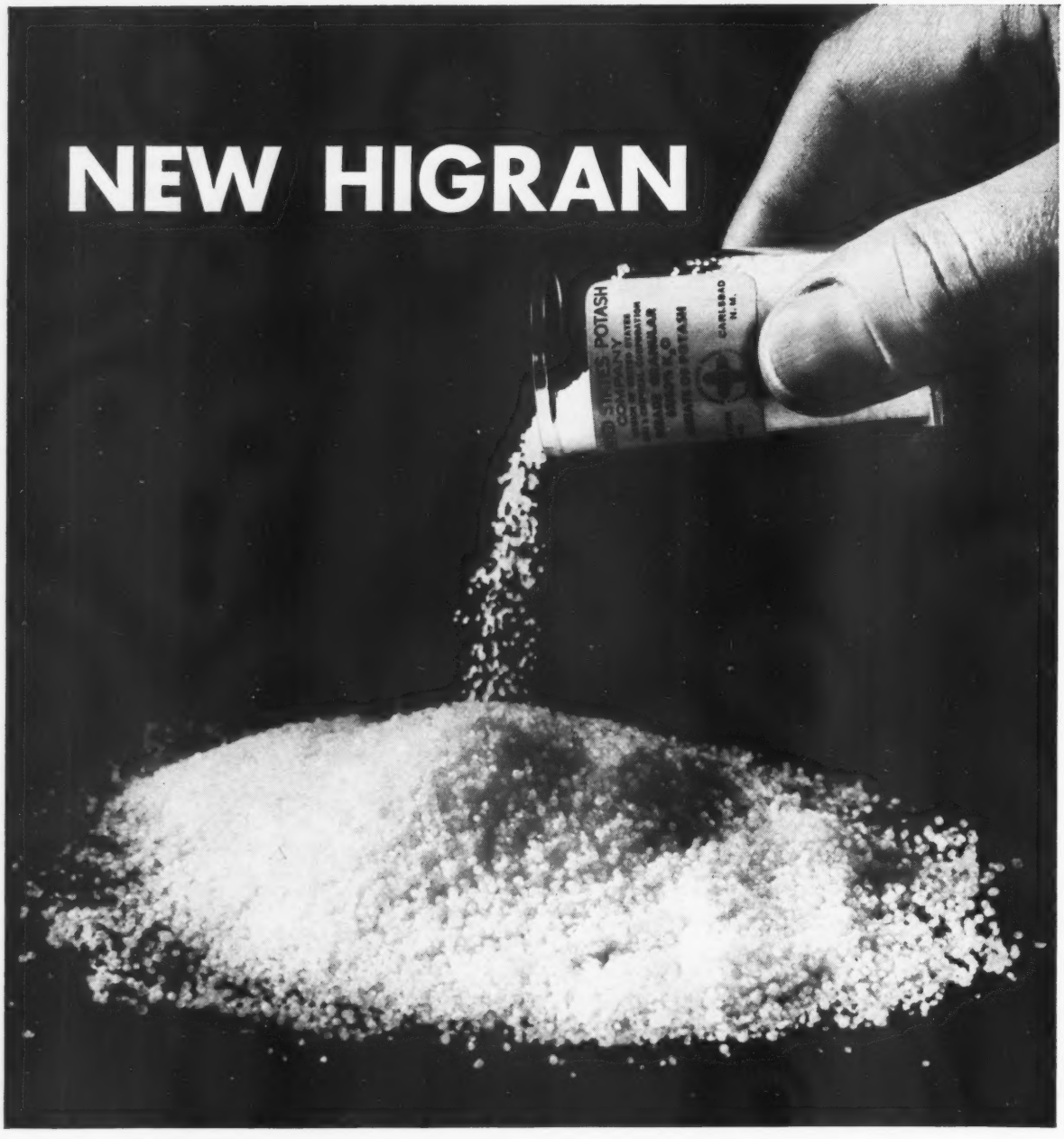

USP'S NEW HIGRADE GRANULAR SPECIALLY SIZED FOR THE MANUFACTURE OF MODERN FERTILIZERS

USP announces the FIRST Higrade Granular muriate of potash designed specifically for the manufacture of today's modern fertilizers. Its perfect whiteness attests to its purity—the highest now available in granular agricultural muriate of potash. Non-caking and free-flowing throughout, USP's new Higrade Granular potash contains 62/63% K_2O! A regular supply of this important new potash product is immediately available from the U.S. Potash Co.

USP also offers Higrade muriate of potash—62/63% K_2O and Granular muriate of potash—60% K_2O—both free-flowing and non-caking.

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VIEWING WASHINGTON

with Farm Chemicals Washington Bureau

on agriculture

A new farm program by the Administration is likely to result from the current unsettled farm situation. President Eisenhower recently hinted broadly that he would present a program to Congress next winter--apparently in a move to put the Administration on the offensive, rather than be at the disadvantage of trying to defend present policies in an election year.

How "new" this program will be is not known at this point. Secretary Benson's long-time policy has been to reduce price supports, on the theory that it will discourage over-production. This can hardly be called a plan for the future. After supports have been reduced to "protective" levels, the Secretary at present has no "program" for the years ahead. It is this vacuum that the Administration will try to fill before the 1958 elections.

Official disappointment over federal policy to improve the farm picture to date increasingly becomes evident. For example, in ducking a press conference question on a new farm program, the President declared: "I can merely say this: That almost every week we get a new presentation in the Cabinet of some of the difficulties in this whole field, and a certainty that not everything is working as you would hope it would."

A new "farm bloc" may be in the making in Washington. With the old bloc of wheat, cotton and corn legislators torn by strife over alleged favoritism to some crops, we may be witnessing the birth of a new alliance which would write the major farm laws of the future. This is the National Conference of Commodity Organizations--a union of national associations which represent single commodity producers.

Idea behind the NCCO is to bring all farm commodity organizations together in support of each other's proposals in Congress. Scheduled to have a second meeting in August, it cuts across lines of the old established general farm organizations, which, enthusiasts feel, have done a poor job on major farm policy to date and don't represent producers of specific crops anyway. NCCO could become a real power in the field. Each group controls votes in Congress. If it can combine these votes, it feels it can put across legislation tailor-made for each commodity.

Wheat marketing quotas again will be in effect in 1958. Growers voted almost 85 per cent in favor of continuing quotas--considerably more in favor than was expected. Because of lower 1958 support, down to $1.78 a bushel from this year's $2., plus drought's break-up and high wheat prices in some areas--the issue was in doubt up to voting time. The vote compares with 87 per cent in 1957, 77 per cent in 1956, and 73 per cent in 1955.

With stringent marketing quotas, which provide cash penalties for over-planting allotments, the national allotment will continue at 55 million acres, the legal minimum.

VIEWING WASHINGTON

agriculture Continued

Soil Bank's acreage reserve will continue in 1958. The House bowed to the Senate over the issue. The Lower Chamber had voted by a narrow margin to kill the program after this year, but the Senate voted unanimously to continue it. This means that another half-billion dollars will be paid farmers to remove from one year's production acreage in corn, cotton, wheat, rice and tobacco.

Price support for farmers who don't stick with corn allotments again is expected to be offered by the USDA this year. The large corn and feed grain crop now in prospect points to a market bust this fall, officials fear, unless some stop-loss support is provided. While corn in the commercial area is propped at $1.36 a bushel, many farmers have over-planted the allotment because of the severe cut-back this year. Support for non-compliance corn is expected to be $1.15 or lower.

Interest rates on government-sponsored loans are due to go up. In addition to some government business loans, it means higher rates--and more cost-price pinch on farmers-- for farm operational, "disaster," and production loans, and commodity credit, irrigation, reclamation and rural electrification loans.

The plan was outlined to Congress in an "executive communication" from the White House. Hitting across the board, the President's proposal would permit the government to raise interest rates to whatever level the government pays when it borrows money. Since interest limits on many types of loans are set by law, legislation will be required to provide the higher authority.

The 1957 official "Insecticide Recommendations Handbook" has just been put out by the Agriculture Department. The 109-page farmers' guide spells out in detail what pesticides are recommended for use against which insects; also, what the tolerance is, what formulation to use, what dosage, how to apply, plus any restrictions as to timing of applications, etc.

The handbook is of particular significance this year, since, for the first time, it gives pesticide use recommendations based on the Miller amendments to the food and drug laws. It's a handy, ready reference, and easy to follow. Single copies are 65c. Write Superintendent of Documents, Government Printing Office, Washington 25, D. C.

The chemical industry plans to smash all records in expenditures on new plant and equipment during 1957, according to the Business and Defense Services Administration. The industry anticipates spending $895 million during the first half of the year, with a total for the year of $1.8 billion.

Capital expenditures projected for the first half represent an increase of 11 per cent over the second half of 1956. BDSA says that if the faster pace for capital outlay in the second half materializes, the total increase for the year would exceed 1956 by 24 per cent.

WHEN ONE-HALF OF THE BOXCAR IS EMPTY... THE TL-6 TURNS AROUND INSIDE THE CAR AND UNLOADS THE OTHER HALF

Compact TL-6 TRACTOLOADER® keeps material moving for CHENOA MILLING COMPANY, Chenoa, Illinois

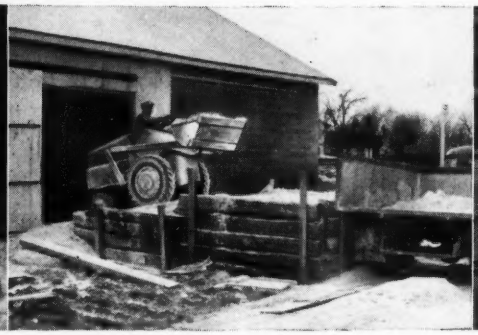
Since there isn't a ramp at Chenoa Milling Company's warehouse (due to railroad restrictions), the TL-6 enters the boxcar containing grain about 200 yards away — where there is a ramp. Car is then moved to warehouse. Here a makeshift bin is fed by the TL-6 and the grain moves into the warehouse on a conveyor. The boxcar stays at the warehouse until it's completely unloaded — no need to move it back to the ramp when half unloaded. The TL-6, with its compact design and short turning radius, easily maneuvers around inside the car to finish its job.

Why not let this ½-yd loader solve your confined-area material handling problems? Get an on-the-job demonstration from your Allis-Chalmers construction machinery dealer.

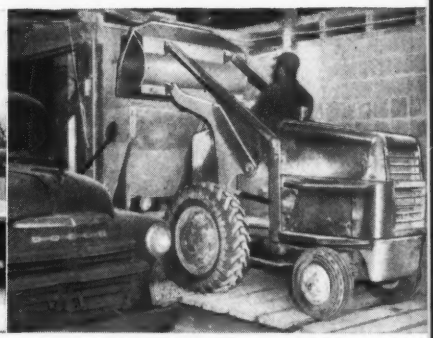
TRACTO — *a sure sign of modern design*

TL-6 QUICKLY HANDLES OTHER JOBS FOR CHENOA MILLING, TOO!

CARRIES FERTILIZER FROM BOXCAR INTO STORAGE SHED — no losing the load, either, with tip-back bucket. Makes complete cycle without shifting — operator just pushes or pulls a lever to go forward or reverse.



DELIVERS FERTILIZER TO CUSTOMER'S TRUCK — a full bucket every time. TL-6 gets load without ramming with smooth crowding action of hydraulic torque converter drive.



LOADS HOPPER WHEN MIXED FERTILIZER IS ORDERED—elevator transports it to mixer. TL-6 makes hairpin turns into and out of the various bins for the different kinds of fertilizer.

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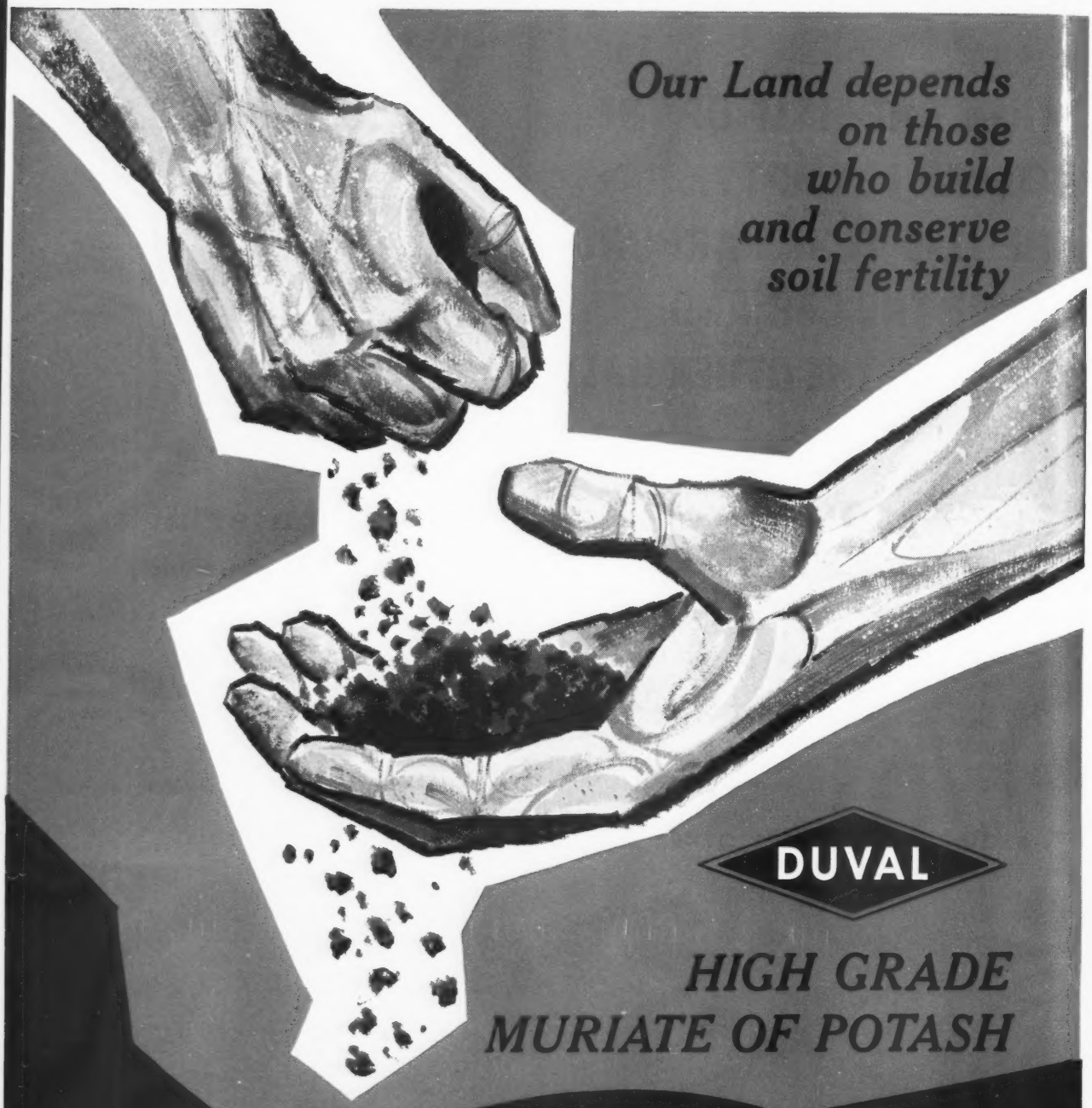

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Arcadian® News

Volume 2 | For Manufacturers of Mixed Fertilizers | Number 7

SUPERPHOSPHATE IS KEY TO FERTILIZER PROGRESS

Great Gains were made with Acidulation and Ammoniation

The greatest progress which has been accomplished in the manufacture of fertilizers in this country centers on superphosphate and is the result of industry research.

Research by fertilizer manufacturers developed: **1**) The production of superphosphate by the acidulation of phosphate rock. **2**) The production of nitrogen solutions for the ammoniation of superphosphate to provide an economical base for mixed fertilizers.

Superphosphate is the heart of a fertilizer technology which has supplied American farmers with millions of tons of efficient crop-producing power at low cost. And this technology is the fruit of industry initiative.

Superphosphate has many advantages over other phosphorus carriers. It is the lowest cost source of phosphorus. It contains large quantities of gypsum. Gypsum is an excellent soil conditioner and also provides large quantities of calcium and sulphur, both of which are essential plant foods.

Superphosphate supplies phosphorus that remains in the soil available to plants over a longer period than phosphorus from other carriers. Other forms of phosphorus have a greater tendency to become fixed in the soil in compounds that cannot be absorbed by plants.

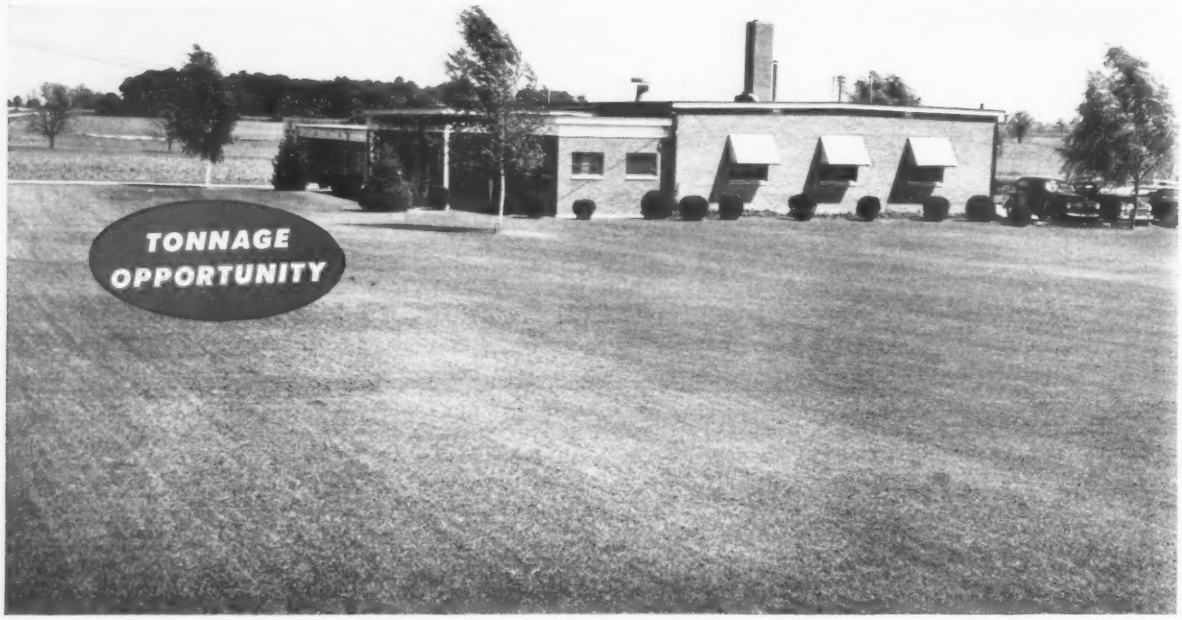
Superphosphate will absorb more low-cost nitrogen through ammoniation with low-cost nitrogen solutions than any other form of phosphorus. Low-cost superphosphate and low-cost nitrogen solutions have enabled fertilizer manufacturers to supply farmers with low-cost, high-quality fertilizers.

Industry research in the ammoniation of superphosphate with nitrogen solutions has helped in the development of granular mixed fertilizers.

Industry research with ammoniated superphosphate has helped in the improvement of the condition of all types of fertilizers and helped in the development of granular fertilizers. High take-up of free ammonia by superphosphate is desirable in any fertilizer and particularly desirable in granular fertilizers. High rate of ammoniation provides nitrogen at low cost and also provides heat at an opportune time in the granulation process.

As long as fertilizer manufacturers continue to make the largest possible utilization of superphosphate and high levels of ammoniation, the situation favorable to the increased use of fertilizer will exist and flourish.

Arcadian News for Fertilizer Manufacturers . . . . . from NITROGEN DIVISION



GRASS...big fertilizer market!

Just look around you and everywhere you'll see a big, new fertilizer market growing up fast. It's grass!

Attractive lawns are the pride of modern homeowners, and the first goal of new residents. Fine, healthy turf is of top importance to parks, playgrounds and golf courses. New plants and offices that dot the suburbs and countryside are landscaped in grass. Millions of miles of highways are banked by grass.

Every year 1¼ million acres of land go out of farming and become homes, roads and factories. Most of this area is actually planted to grass.

The roll of the golf ball, the happiness of the Little Leaguer, the gratification of the homeowner and plant manager, the job of the greenskeeper, and the protection and beautification of our roadsides *all* depend on keeping grass growing well. And that takes special fertilizer.

Grass Needs Enduring Nitrogen

Yes, we all like good grass in our surroundings, but not all of us have it. Crop fertilizers used for turf often produce luxuriant growth for a few weeks, then grass comes to a standstill until more fertilizer containing nitrogen is applied.

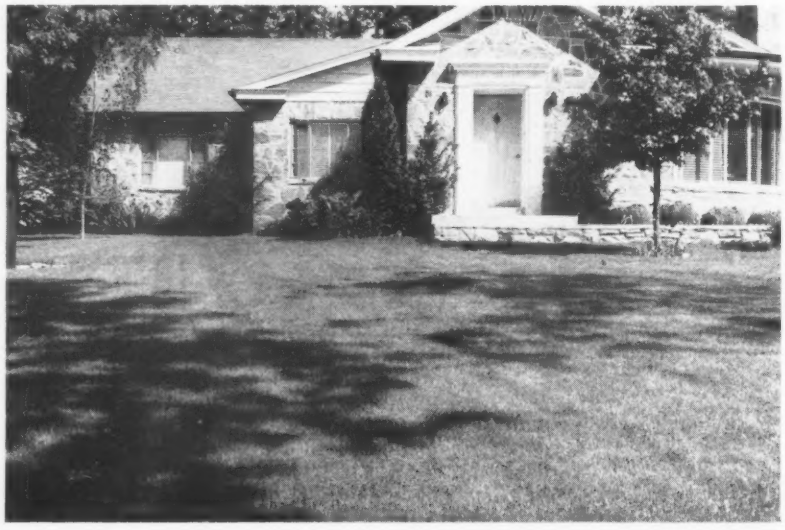
Golf course superintendents have learned to keep greens and fairways fertilized throughout the year, but most persons can't be bothered. And there's no reason why they should be! Now wonderful new fertilizers containing N-dure* nitrogen provide enduring nitrogen that feeds grass thoroughly and evenly for months. It is ideal for ornamentals too, and for specialty crops.

Nitrogen Division research has perfected a combination of N-dure urea-formaldehyde solution and urea for use in fertilizers to make nitrogen available to plants at a uniform rate for months, instead of in a sudden splurge.

N-dure enables fertilizer manufacturers to provide economical, enduring nitrogen in mixing semi-granular, non-segregating, non-burning fertilizers. This golden liquid urea-formaldehyde solution, with additional urea, builds urea-form during the manufacturing process of making a chemically-controlled mixed fertilizer.

N-dure and urea in mixed fertilizers result in enduring nitrogen at economical cost, with no burning, no leaching and no harmful residues. Also, there's a saving of labor for the user.

You get non-dusting, semi-granular condition by using N-dure plus urea in making a lasting mixed fertilizer. Formation of ureaform in the process of mixing helps to reduce hazard of burning from other fertilizer salts as well as from nitro-



*Trade-mark

SINGLE APPLICATION OF FALL FERTILIZER SAVES WORK IN GROWING WHEAT

Several years of wheat fertilizer demonstrations on farms in 14 Ohio counties show that 1-1-1 ratio fertilizers produce better yields than low-nitrogen mixed fertilizers such as 3-12-12 or 5-14-14. Also, application at seeding time of 400 pounds of 10-10-10 gave as good yields as a split application of 200 pounds per acre of 10-10-10 in fall plus 200 pounds per acre in spring top-dressing. Over two seasons, average yield with fall application of 400 pounds of 10-10-10 was 38.9 bushels. With split application of 400 pounds of 10-10-10, yield was 38 bushels. With low-nitrogen mixed fertilizer, applied either in the fall or in split application, yield averaged 35.6 bushels.

Highest yield on any farm using a single fall application of 400 pounds of 10-10-10 was 53.3 bushels. Highest yield with a split application of 400 pounds of 10-10-10 was 52.2 bushels. Best yield with a low-nitrogen fertilizer, 400 pounds of 5-10-10, was 45.7 bushels.

gen. In well-balanced mixed fertilizers, mixtures can be made in a wide variety of nitrogen ratios. You can easily control the ratio of lasting action to quick action with standard ammoniating equipment.

The fall months are a perfect time to fertilize grass and ornamentals, and this year more people than ever before will be in the market for fertilizer.

For full information on how N-dure can help you make profits from the growing turf and specialty market, write to Nitrogen Division, Allied Chemical, 40 Rector Street, New York 6, N.Y.

How to Find Extra Profits in Your 1957-58 Production Plans

In making plans for your 1957-58 production, the best place to look for bigger profits may be right in your own plant. Sometimes operating costs, higher than necessary, are "hiding" in a fertilizer plant that seems to be operating smoothly. If you can reduce these costs you will increase your profits.

One of the practical ways to pare down costs is to use the nitrogen solutions and other ingredients specifically adapted to the fertilizers you plan to produce. With the selection of the right methods and materials, you may be able to cut costs and improve quality in all your mixed fertilizers.

Why not get the help of a Nitrogen Division technical man? He will be glad to suggest immediate and economical changes to help you gear your output into a much more profitable operation. His services are available to Nitrogen Division customers without cost. Whether your problems are in ammoniation, formulation, granulation, condition, converting old equipment or selecting new, you can receive this technical service fast.

Manufacturing Know-how

Nitrogen Division maintains a large staff of trained technologists, experienced in all phases of the fertilizer business. The skills and abilities of hundreds of well-qualified scientists, technicians, and engineers are available to help work out your problems. This technical service staff uses millions of dollars' worth of laboratory and pilot plant equipment.

Ask your Nitrogen Division salesman to line up the technical aid essential to the solution of your problems. He can call for ready help that will come up with realistic answers to any fertilizer production situation. This Nitrogen Division service is based on 30 years of fertilizer and nitrogen experience.

Right in your own plant, as well as in their laboratories, Nitrogen Division technicians will work on your trouble spots until a practical answer develops. But they are more than trouble shooters. They have spent years in originating new and better nitrogen solutions to fit your manufacturing methods. Their goal is to help you streamline your plant operations to get best results, with the least possible change in equipment.

Their Full-time Job

If you contemplate production of mixed fertilizers new to your plant, their assistance will be of special benefit. Nitrogen Division technical men do not sell equipment. They spend their full time developing nitrogen solutions and helping organize production line systems for making high-quality, pulverized and granular fertilizers at low cost.

Extensive and continuing research by Nitrogen Division developed major innovations in fertilizer practice, such as ammoniation of superphosphate. Nitrogen Division knows fertilizer plant methods, inside and out! You can get prompt and efficient assistance from the technical service staff right now—and remember, it's without charge to customers. Talk to your Nitrogen Division salesman, or contact Nitrogen Division, Allied Chemical, 40 Rector St., New York, N. Y.

NITROGEN *plus* SERVICE

There are many reasons why it pays you to deal with Nitrogen Division, Allied Chemical. You are served by America's leading producer of the most complete line of nitrogen products. You benefit from millions of tons of nitrogen experience and the enterprising research that originated and developed nitrogen solutions for the fertilizer industry. You are assured of dependable supplies from three huge plants at Hopewell, Ironton, and Omaha. Your nitrogen is delivered to you by the best transportation facilities and equipment. You get technical assistance and formulation advice from the largest and most efficient staff of nitrogen experts. Your sales are supported by the most powerful advertising campaign ever conducted to sell fertilizers. Nitrogen Division is your headquarters for NITROGEN *plus* SERVICE. Look over the big line and contact one of the 14 offices listed below.

Arcadian® Nitrogen Solutions

	CHEMICAL COMPOSITION %					PHYSICAL PROPERTIES		
	Total Nitrogen	Anhydrous Ammonia	Ammonium Nitrate	Urea	Water	Approx. Sp. Grav. at 60°F	Approx. Vap. Press. at 104°F per Sq. In. Gauge	Approx. Temp. at Which Salt Begins to Crystallize °F
NITRANA®								
2	41.0	22.2	65.0	—	12.8	1.137	10	21
2M	44.0	23.8	69.8	—	6.4	1.147	18	26
3	41.0	26.3	55.5	—	18.2	1.079	17	-25
3M	44.0	28.0	60.0	—	12.0	1.083	25	-36
3MC	47.0	29.7	64.5	—	5.8	1.089	34	-30
4	37.0	16.6	66.8	—	16.6	1.188	1	56
4M	41.0	19.0	72.5	—	8.5	1.194	7	61
6	49.0	34.0	60.0	—	6.0	1.052	48	-52
7	45.0	25.3	69.2	—	5.5	1.134	22	1
URANA®								
10	44.4	24.5	56.0	10.0	9.5	1.108	22	-15
11	41.0	19.0	58.0	11.0	12.0	1.162	10	7
12	44.4	26.0	50.0	12.0	12.0	1.081	25	- 7
13	49.0	33.0	45.1	13.0	8.9	1.033	51	-17
15	44.0	28.0	40.0	15.0	17.0	1.052	29	1
U-A-S®								
A	45.4	36.8	—	32.5	30.7	0.925	57	16
B	45.3	30.6	—	43.1	26.3	0.972	48	46
Anhydrous Ammonia	82.2	99.9	—	—	—	0.618	211	—

Other ARCADIAN® Nitrogen Products: UREA 45 • A-N-L® Nitrogen Fertilizer
Ammonium Nitrate • American Nitrate of Soda • Sulphate of Ammonia

NITROGEN DIVISION Allied Chemical & Dye Corporation

MAIN OFFICE: 40 Rector Street, New York 6, N. Y., Phone: Hanover 2-7300

Branch Offices	Phone
Hopewell, Va., P. O. Drawer 131	Cedar 9-6301
Ironton, Ohio, P. O. Box 98	Ironton 8-4366
Omaha 7, Neb., P. O. Box 166	Bellevue 1464
Raleigh, N. C., 16 W. Martin St.	Temple 3-2801
Columbia 1, S. C., 1203 Gervais St.	Columbia 3-6676
Atlanta 3, Ga., 127 Peachtree St., N. E.	Jackson 2-7805
Memphis 9, Tenn., 1929-B South 3rd St.	Whitehall 8-2692
Columbia, Mo., P. O. Box 188	Gibson 2-4040
Indianapolis 20, Ind., 6060 College Ave.	Clifford 5-5443
Kalamazoo, Mich., P. O. Box 869	Kalamazoo 5-8676
St. Paul 4, Minn., 45 N. Snelling Ave.	Midway 5-2864
Los Angeles 5, Cal., 2999 West 6th St.	Dunkirk 8-3201
San Francisco 4, Cal., 235 Montgomery St.	Yukon 2-6840

Chemicals

186—CARRICLAY & PULGITE

For economical formulations of concentrates, dusts and wettable powders, Magnet Cove Barium Corp. suggests you investigate Carriclay and Pulgite. In kiln-drying its attapulgite carriers and diluents, Magcobar reports it uses a lower temperature for a longer period—thus baking each particle all the way through for a more uniform product. For further information,

CIRCLE 186 ON SERVICE CARD

187—TRONA PRODUCTS

A complete 12-page products catalog and informational booklet has been issued by American Potash & Chemical Corp. Included are descriptions, properties and applications of nearly 70 chemicals marketed under the company's Trona trademark. If you'd like a copy,

CIRCLE 187 ON SERVICE CARD

188—TOLERANCE FOLDER

A wallet size folder containing a list of pesticide spray tolerances, giving time limitation in days before harvest on various crops, is available without charge from United-Heckathorn. The USDA provided the information which appears in condensed form in the folder.

For your copy,

CIRCLE 188 ON SERVICE CARD

189—SULFONATE BULLETIN

Sulfonate OS, an anionic surface active agent for use as an emulsifying and dispersing agent in insecticide formulations is described in a new bulletin issued by the Sun Oil Company.

For free copies just

CIRCLE 189 ON SERVICE CARD

190—TOXAPHENE INSECTICIDES

The use of toxaphene insecticides, to control various insect pests which attack tomatoes, is described in a new folder issued by Hercules Powder Company.

The leaflet discusses typical applications for the control of tomato hornworm, tomato russet mite, flea beetles, vegetable weevil, cutworms, tomato fruitworm, and blister beetles. For your free copy

CIRCLE 190 ON SERVICE CARD

191—NEW CRAG MYLONE FOLDER

A new folder explaining how to use Crag Mylone is now available from Union Carbide Chemicals Co. Mylone is a new, powdered soil fumigant that needs no plastic cover. It acts as a herbicide, soil fungicide, and nematocide in pre-planting treatments on a variety of ornamentals.

For your free copy

CIRCLE 191 ON SERVICE CARD

FREE INFORMATION to help you solve fertilizer, pesticide problems

Reader Service

192—TAKO KAOLINITIC KAOLIN

Excellent adhesive-absorption qualities are claimed for Thomas Alabama Kaolin Co.'s High Grade Colloidal Kaolinitic Kaolin Clay. The manufacturer says Tako excels in formulations of pesticides—inert colloidal properties increase toxic action, give increased workability, dispersion, absolute minimum drifting. Free information is available.

CIRCLE 192 ON SERVICE CARD

193—NEW INSECT-REPELLENT

The Glenn Chemical Company has full information and price lists now available for its new insect-repellent Tabutrex. The company claims that Tabutrex has 23 separate and distinct proven advantages. More complete information and price lists are available free by just

CIRCLING 193 ON SERVICE CARD

194—SULFUR SIDELIGHTS

If you have any questions about sulfur they probably are answered in the 50-page booklet published by the Stauffer Chemical Co. entitled "Stauffer Sulfurs."

The booklet reviews handling operations, physical and chemical properties, the history of sulfur, its occurrence and uses, production and refining processes and etc.

For your copy just

CIRCLE 194 ON SERVICE CARD

Process Equipt.

195—FLOW METER BULLETIN

A novel and convenient means for aiding prospective users of Brooks Rotameter Co.'s flow meters in selecting the right meter for a specific application is utilized in the company's new bulletin. A die cut disc eyeletted on the inside cover indicates the pressure and temperature limitations of Brooks rotameters as well as their flow capacity ranges. For your copy of "A Brief Guide to the Brooks Rotameter Line," just

CIRCLE 195 ON SERVICE CARD

How to use the

READER SERVICE CARD

- **Circle number of literature you want.**
- **Print or type your name, position, company and address.**
- **Clip and mail the Service Card.**

196—CONTROLLED VOLUME PUMPS

The Milton Roy Co. has a new 32-page bulletin which describes its complete line of motor-driven controlled volume pumps. It contains complete specifications and latest design features of these positive displacement pumps, designed for precise metering and pumping of corrosive liquids against pressure.

Standard and modified models and their applications are illustrated and described. For a copy

CIRCLE 196 ON SERVICE CARD

197—CONTINUOUS ACIDULATION PLANTS

Now small and medium sized fertilizer operators can afford a D-K superphosphate plant with continuous den and TVA cone mixer, reports Davidson Kennedy Company. Two men can operate the plant at the continuous rate of 20 tons per hour.

For complete information

CIRCLE 197 ON SERVICE CARD

198—BLUE VALLEY GRANULATOR

Are you considering quality granulation? Blue Valley Equip. Mfg. and Engineering Co., which just installed its 30th granulation unit, will send you information on its Granulator if you

CIRCLE 198 ON SERVICE CARD

199—SACKETT STAR

The Sackett STAR Granulator will give you controlled grain size, higher product recovery, higher production capacity and lower drying cost, reports A. J. Sackett and Sons Co. Capacity range is from 15 to 60 tons per hour. For details,

CIRCLE 199 ON SERVICE CARD

Packaging

200—SAVE TIME, MONEY, LABOR

Richardson Scale Co. says you can save time, money and labor with its Model FFP automatic bagging scales. A two-color, six-page bulletin gives a full description of the scales and includes 12 illustrations. Three styles are available—floor portable, overhead portable and overhead stationary.

For your free copy,

CIRCLE 200 ON SERVICE CARD

201—BAGPAK CLOSER

A new brochure from International Paper Co. gives inside details of the bag closing machines just introduced by the firm's Bagpak Div. For your free copy of "The Latest and Most Versatile Bagpak Closer,"

CIRCLE 201 ON SERVICE CARD

202—PACKAGING HEAVY GOODS

An illustrated 28-page booklet on how to cut costs, simplify packing and improve efficiency in the packaging of heavy products has just been published by Hinde & Dauch.

To get your free copy of "How to Ship Heavy Products in Corrugated Boxes" just

CIRCLE 202 ON SERVICE CARD

Materials Handling

203—CLARK CATALOG

The complete line of fork-lift trucks, straddle carriers, powered hand trucks and towing tractors produced by Clark Equipment Co.'s Industrial Truck Div. is described in a 16-page, four-color catalog just published by the company. Every machine is illustrated.

A free copy is yours if you

CIRCLE 203 ON SERVICE CARD

204—NEW TRACTOMOTIVE BOOKLET

A new two-color booklet describing the "Tractoloader" line has been published by the Tractomotive Corporation. The 16 page booklet is well illustrated and includes a section on attachments. For your free copy just

CIRCLE 204 ON SERVICE CARD

205—SHADOGRAPH SCALES

A new eight-page brochure on SHADOGRAPH Scales designed for use in the chemical industry has been published by The Exact Weight Scale Co. It contains numerous illustrations, detailed specifications, and important features of 34 different models, ranging in capacities from 2000 MG up to 100 pounds. For your free copy

CIRCLE 205 ON SERVICE CARD

206—NEW CONTAINER CATALOG

A new 16-page catalog designed to describe the company's complete line of materials handling containers has just been released by the Continental-Diamond Fibre Corp.

For your free copy of this catalog entitled "CDF Materials Handling Containers" just

CIRCLE 206 ON SERVICE CARD

Miscellaneous

207—AXIVANE FANS

A 16-page booklet from Joy Mfg. tells all about Axivane Fans. The company reports it pioneered in the development of vaneaxial fans and is the world's largest manufacturer of these units. The booklet pictures some typical installations and includes specifications. For a copy,

CIRCLE 207 ON SERVICE CARD

How to use the

READER SERVICE CARD

- **Circle number of literature you want**
- **Print or type your name, position, company and address,**
- **Clip and mail the Service Card.**

208—SEED TREATMENT BOOKLET

A new, well-illustrated 16-page booklet on modern seed treatment has been published by Panogen, Inc. The easy-reading booklet describes how seed treatment works, when it pays to treat seed, and what it can do to improve crop quality.

For your free copy just

CIRCLE 208 ON SERVICE CARD

209—SAFETY CHECK LIST DETECTS EXPLOSION HAZARDS

To locate hidden probabilities of electrically ignited explosions in plants, a "Hazard Finder" is being made available by the Crouse Hinds Company.

To get your free copy of this eight page illustrated folder and "check list" just

CIRCLE 209 ON SERVICE CARD

See pages 58, 60 & 61 for information on these Reader Service Numbers—

211—Spray Nozzles
212—Screw Conveyor
213—Plastic Faucet
214—Acto Cutter
215—Disc Feeder
216—Emcol Emulsifier

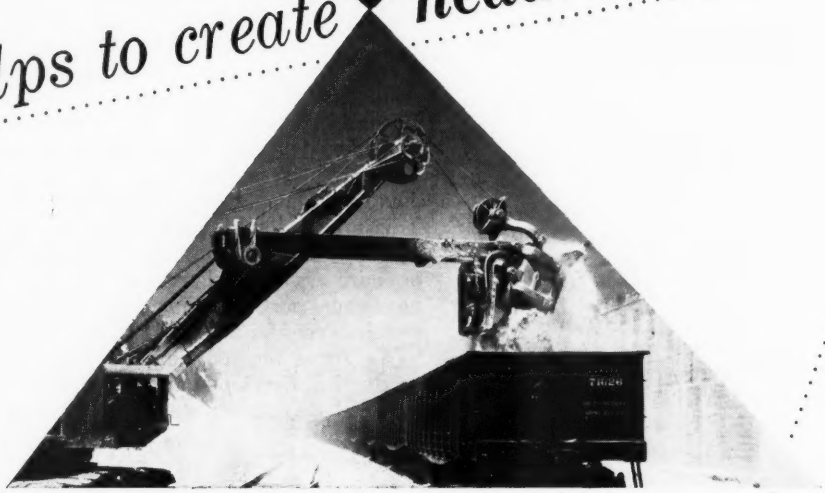
210—NEW VALVE BULLETIN

A new bulletin describing its line of chemical relief valves and back pressure valves has just been published by the Milton Roy Company. The 4-page, two color bulletin gives complete specifications including capacities of four standard sizes. For your free copy

CIRCLE 210 ON SERVICE CARD

SULPHUR

helps to create headline products



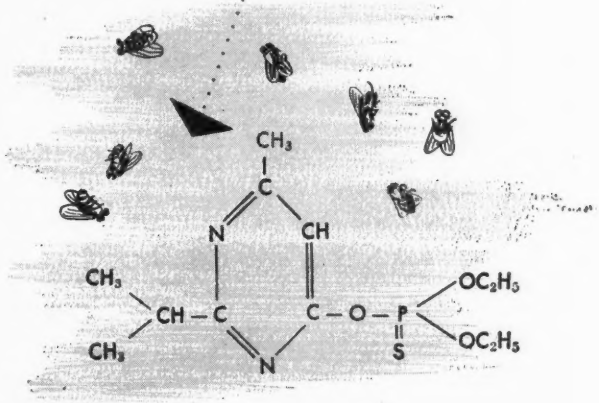
DIAZINON*

What a 'killer' this complex chemical is turning out to be! And quite impartial as to its victims: — houseflies, barnflies, fruitflies, aphids, mites, ants, beetles, chinch bugs, roaches, and many other pests that bother man and beast. It kills them dead!

As with the former chemicals which made such notable headway in man's fight to subdue these destructive pests, Sulphur is very much in the picture—here is one of the many variations of the benzene ring . . . the Diazinon Formula. That letter "S" tied in with the letter "P" discloses the all-important thiophosphate.

Sulphur, often called one of the Four Pillars of the Processing Industry, is benefiting mankind in many ways. None is more important than that of controlling crop-destroying pests.

**A product of the Geigy Chemical Corporation.*



Texas Gulf Sulphur Co.

75 East 45th Street, New York 17, N. Y.
811 Rusk Avenue, Houston 2, Texas

Sulphur Producing Units
- Newgulf, Texas
- Moss Bluff, Texas
- Spindletop, Texas
- Worland, Wyoming

MANAGEMENT LOOKS AT THE SALES FORCE

by

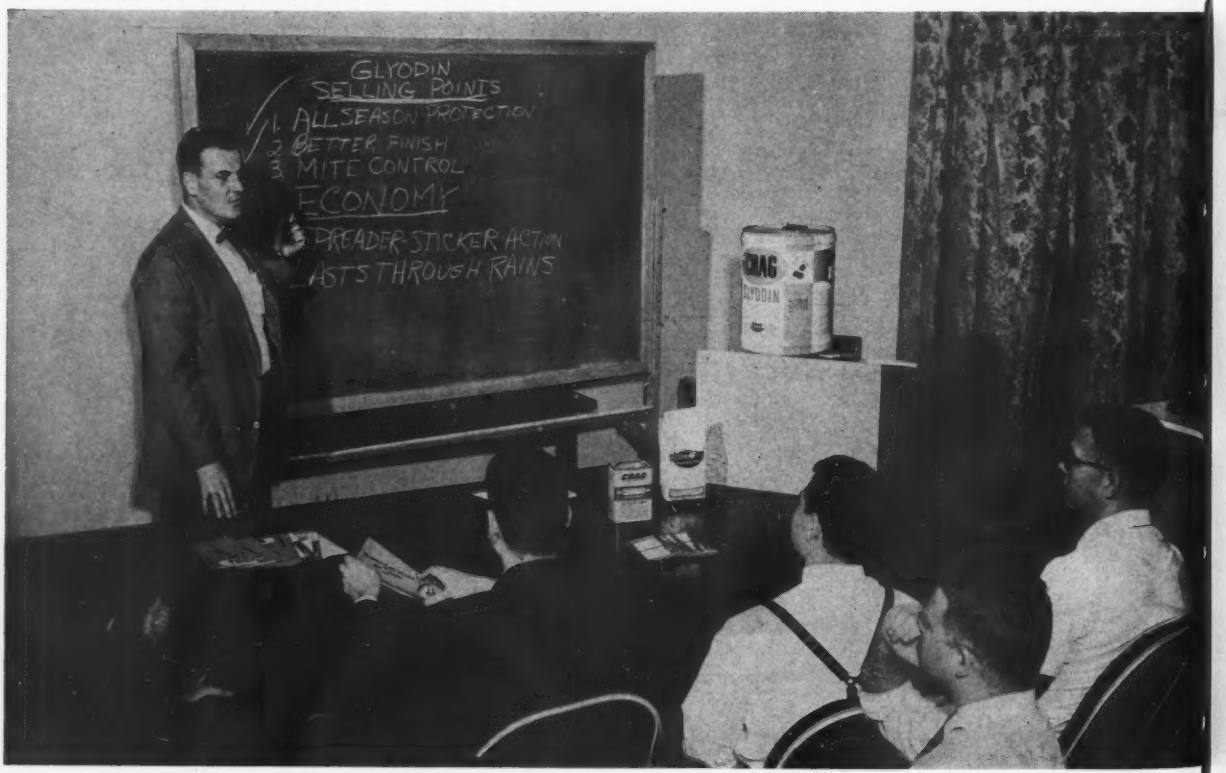
Dr. R. H. Wellman

Selling agricultural chemicals is an extra special kind of a job—it's not like selling costume jewelry, for example. In selling jewelry, and many other consumer products, there's a strong appeal made to the customer's emotions. By and large, this situation does not exist in agricultural chemicals selling. It is more of a technical business, and is based on knowledge of your chemicals' performance, and how they will fit into the farmer's operation. Our men don't "sell by the book"—they get out and show people how to use materials. They are technically trained to demonstrate what they are asking others to do.

Also, this business is considerably different from selling industrial chemicals in that the user of agricultural chemicals does not possess technical background to develop these materials on his own.

▸Sales perform a singular task in the function of developing and marketing agricultural chemicals. This is not to imply that we consider our sales department more important than other departments. To organize a successful team of any kind, you should have equal parties pulling their own weight, and this certainly goes for the agricultural chemicals business.

We strive for complete cooperation of research, production, development, advertising, sales, and the financial department—all these groups have equal importance. It is the sales department, however, which must bring to fruition the efforts of the rest of the team. If we do not have a profitable operation, we have nothing, and it is the responsibility of our sales department to sell enough products so that we make a profit.



Our salesmen are "Mr. Carbide" in their individual areas. It's their job to find out what is needed to increase sales. To do this, they must be versatile, for they have to meet and solve a wide range of problems that may include everything from product development to distribution. We ask our salesmen to analyze the limitations of our products and those of the competition, and to point out areas in which new products are needed.

We don't want a clear-cut distinction between technical development men and salesmen in our organization. It's our belief that when you make these distinctions you build up a wall around development of breadth of vision. Then, most of your people will come right up to it and stop. Few will even bother to keep over—it's just human nature.

Our idea is to tear down walls whenever they start to rise. We want no hard and fast distinction beween groups, and we strive to stimulate a free flow of information and ideas back and forth between our development men and salesmen. Members of each group must often fill in for each other on various assignments.

▸In training our men to sell agricultural chemicals, we tell them that their first duty is to present the facts. There are three phases, we think, to a successful selling job: (1) Present the facts to your customer; (2) Allow him to make up his mind; (3) Convince him he should take some positive action on his decision.

When our salesmen present their sales story, they are urged to emphasize the advantages of our products, but to represent these advantages truthfully—we do not say our products will do something they won't do. We have an ethical duty to sell truthfully, but even if this did not exist, it still would not be to the advantage of any agricultural chemicals salesman to misrepresent his product for the sake of a sale. He really doesn't have a worthwhile product unless the farmer becomes a steady customer.

Our sales department is instructed to bring all honest influences to bear on a prospective customer. This is a big job because it includes demonstrating and teaching, as we said before, in addition to talking. The department is not limited to selling *per se;* rather, it is engaged in a type of selling that has a good deal of depth. As we sell, we are carefully building for the future. We are taking chemicals that are just beginning to be known and establishing markets. With other chemicals, placed in the field on an experimental basis, we are trying to determine if they are marketable products. In all cases, we are out to develop chemicals that will bring the farmer back not only for that second sale, but for numerous repeat sales.

▸It's true that the farmer is the customer who buys the chemical and uses it, but agricultural chemicals salesmen must convince, basically, five different groups before a sale can be made. They are: (1) Experiment station personnel; (2) Extension personnel, such as county agents; (3) Distrubutors; (4) Dealers; (5) Farmers and Stockmen.

You must convince the other groups before you can do business with the farmer. You get your "License to do business," so to speak, from the experiment station, you must win confidence and recommendations from the local county agent, and you have to convince distrubutors and dealers that they should stock and push your product. Only then are you ready to sell to the farmer.

We tell our salesmen that it's important to sell influential growers, because it's obviously impossible for a single salesman to talk to all growers in his area. Whenever possible, however, our representatives personally contact large groups of growers by conducting dealer and grower meetings.

▸Though our salesmen have an all-important role to play in "Operation Profit," they don't have special privileges in our company. They have duties, and with these duties they have commensurate authority and freedom to accomplish their job of moving, in an intelligent way, every pound of chemical that we have to sell.

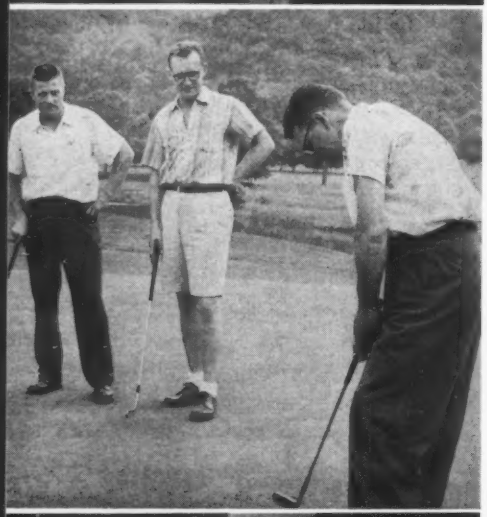
We expect our salesmen to be creative. We don't believe that top levels of the company should monopolize the right to create. Creativity must come from the individuals who are developing products and contacting customers, and management, in many cases, should concern itself with deciding between alternate proposals.

All members of our sales department have an open path through my door. And, in return, I consider it part of my job to beat a path to each salesman's territory, regularly. You don't learn how to solve agricultural chemicals marketing problems by sitting in an office in the city.

To make intelligent management decisions, we must hear about problems from our salesmen in the field. But we at Carbide expect more from our salesmen than news that problems exist. We expect them to explain each problem, clearly and succinctly, and offer a choice of intelligent solutions.

We also expect them to "needle" management into getting the problem solved! And the main problem is to build sales quickly and soundly so that agricultural chemicals can become as profitable as the rest of the chemical industry. Solving this problem provides the sound basis for investing in further research and development to serve the farmer better each year.

Dr. Wellman is Manager of the Crag Agricultural Chemicals Department of Union Carbide Chemicals Company, Division of Union Carbide Corporation. He is well qualified to write as an agricultural chemicals authority, for he combines an impressive ability for company management and aggressive sales direction with a background that is strong in research and technical development.



NPFI Annual Meeting

EXPLORING THE FERTILIZER MARKET

A PROGRAM designed to increase the market expansion program and promotional activities of the National Plant Food Institute was approved by the members at their annual meeting held at The Greenbrier Hotel, White Sulphur Springs, W. Va., last month.

The program was adopted despite the negative vote voiced by six potash producing companies, who claimed the "additional financial burden" would be too much. (see page 45 for the complete story on the expansion activities).

Monday morning's program, besides the business meeting, included a panel discussion on "How Big is the Fertilizer Business." In summary the panel said the fertilizer industry can be expanded several times if the industry wishes to make the effort. The farmers have the assets, now it's up to the industry to prove its salesmanship. (see page 43).

Tuesday's program included talks by Senator Karl E. Mundt (R-S.D.) and Dr. Raymond Rodgers, Professor of Banking, Graduate School of Business Administration, New York University.

Senator Mundt told the Institute members that "to return to an era in which the operation of economic principles and policies once again have a dominant part in determining our national destiny, is going to require a substantial shrinkage in the power, in the spending, and in the regulations of the Federal Government."

"By the same token," he added, "it is going to require a lot of added interest and effort on the part of individual citizens desiring to have their ideals have an impact on Government attitudes. The public must also learn a lot more about the political machinery of Freedom and where it needs fixing."

Top to bottom, left to right

♦ **S. L. Nevins, Olin Mathieson Chem. Corp.; Maurice Lockwood, IMCC; Senator Karl Mundt; Weller Noble; C. T. Marshall, Commercial Solvents Corp.**

♦ **E. A. Geoghegan, Southern Cotton Oil Co.; J. A. Howell, Commercial Solvents Corp.; Ralph Douglass, Smith-Douglass Co., Inc.**

♦ **Roy Roughton, IMCC; C. Martin, Miami Fertilizer Co.; D. A. Williams, Peavey Fertilizer Plant.**

♦ **Mrs. F. Lang; Mrs. Russell Coleman; Mrs. V. A. Ericson; Mrs. W. E. Meeken.**

Senator Mundt, who is a member of the Senate Committees on Appropriations, Government Operations, Agriculture and Forestry, and the Investigating Committee, spoke on "Our Fight to Stay Free."

"Today," he said, "I think few, if any, among us will deny the fact that the Government has grown so strong and Federal spending has become so important that the political bias of our National Administrations determine the economic tone of our Nation and the financial status of millions of Americans, whether they be workers or farmers or businessmen."

Senator Mundt said that he was "happy to note and pleased over the fact that this year in Washington more attention is being paid to the 'political machinery' upon which our freedoms rest than in any previous session of Congress since the turn of the century."

"Members of Congress, some of our officials in the Executive Departments, and a great many groups and individuals are expressing concern over two factors in the election processes which comprise our 'political machinery:' (1) Meaningful and effective two-partyism is at a low ebb in the United States; and (2) The bloc-voting by which members of the electoral college cast their votes EN MASSE (winner take all) in presidential elections, thus downrating rural areas and up-rating the election impact of twelve vast cities in eight selected States of far more than average size," he continued. "It is my prevailing conviction that there is nothing more important or essential to the preservation of our American concepts (private ownership; our reward of merit system; recognition of the rights of States and

Quotes

from the panel discussion on "How Big is The Fertilizer Market." Panel members were (top to bottom): O. E. Anderson, Ohio Bankers Association; E. T. York, American Potash Institute; Wilbur Renk, Wisconsin Farmer; Gordon B. Nance, University of Missouri.

"the American farmer can buy every pound of plant food in the next five years that the industry is able to sell him. . . .As a whole, they could double their use of plant food. Yes, credit-wise, they could triple their use of fertilizer. . . . the total assets of American farmers at the beginning of this year stood at $170 billion and total liabilities, on the other hand, on the same date amounted only to $18,800,000,000. . . . Can the rural banks of this country make loans for the purchase of fertilizer on the basis of that balance sheet? The answer is a resounding YES. . . . Can the fertilizer industry, from the supplier of raw material through the manufacturer, the jobber, and the retailer, use this agricultural balance sheet as a foundation for the greatest merchandising program this industry has ever known? Again, the answer is, 'How can we doubt it?' . . . We have a reluctant customer, but he is a customer with a terrific credit potential. I for one, believe he can be persuaded to enter the market."

"the job of the fertilizer industry is two-fold—to encourage and promote research aimed at developing know-how in fertilizer usage—information on the correct levels of fertilizer needed for most efficient production . . . the opportunities for increasing fertilizer usage . . . range from 50 per cent to 300 per cent—or even as much as 1000 per cent increase in plant food usage in some states . . . two major factors which, in my opinion, will determine, to a large extent, the size of the fertilizer market in the years ahead are (1) the demand for agricultural products and (2) the know-how and the desire of the farmer to produce those products more efficiently . . . in the light of the expected expansion in the need for farm products in the years ahead, the National Plant Food Institute has a wonderful opportunity to help show our farmers how to meet these needs more efficiently through increased fertilizer usage."

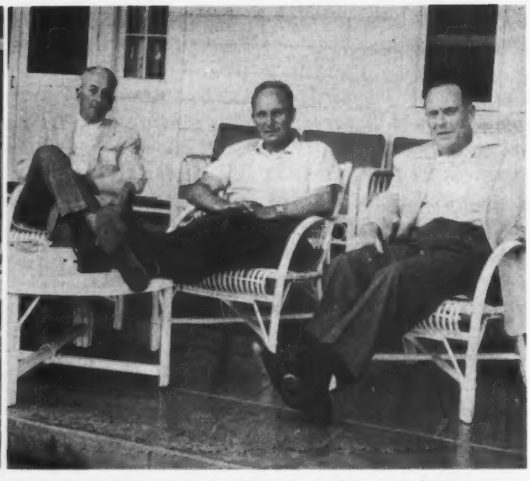
"As our population increases there will be an increased use of fertilizer, but it will all be tied up to our farming economy. A hard-up farmer is not a generous buyer of fertilizer. . . . Fertilizer helps us produce more, and more economically. . . . But . . .we need to find new uses for crops as well as packages to better merchandise farm products . . . As the market expands farmers will buy many tons of fertilizer next year and in the years to come. . . . we try to run an economic operation. We set up goals we'd like to meet, and fertilize to meet them. Our goals . . . 200 bushel corn, 100 bushel oats, 30 bushels of wheat and a 3 ton hay crop. Now average land has only so many nutrients in the soil. . . . if big crops are to be produced something must be added. . . . Each year all of our land is tested and a fertilizer prescription written to attain our goal."

"the plant food industry has a growth potential much greater than that for any industry I know—either established or new. . . . Fertilizers pay dividends that are almost unbelievable to business investors in general or to farmers . . . several reasons have been advanced as to why farmers continue to buy so little fertilizer when it pays so well, none of these are satisfactory to me. . . . One is the risk involved —they fear a bad weather year in which they will not get their fertilizer money back. If this is true, it is indeed strange that they raise, buy and feed cattle and sheep, which on the average returns $1.24 for each dollar's worth of feed used, and in one year in five does not even pay all of that dollar back . . . their loss is irretrievable—the money is gone. But if a drought prevents fertilizer from paying out one year, most of it is available for the next year's crop. . . . another possible reason for the small use of fertilizer may be the lack of salesmanship used."

♦ Row 1 A welcome sight for many of the golfers

♦ Row 2 LEFT: George Garland, The Texas Company; J. J. Lawler, Shell Chemical Co.; RIGHT: Dr. Raymond Rodgers, New York University; J. E. Totman, Summers Fertilizer Co.; C. T. Prindeville, Swift & Co.; E. A. Geoghegan, Southern Cotton Oil Co., Edwin Pate, Dixie Guano Co., Inc.

♦ Row 3 LEFT: Q. S. Lee, Cotton Producers Assoc.; RIGHT: Newly elected officers of the Institute's Research and Education Committee are: Dr. Werner L. Nelson, American Potash Institute; A. H. Bowers, Swift & Co.; Dr. R. P. Thomas, IMCC; Dr. W. H. Garman, NPFI; Joe Sharp, Spencer Chemical Co.



♦ Row 4 LEFT: Under Secretary of Agriculture True D. Morse (left) chats with Wisconsin farmer Wilbur Renk. RIGHT: Deane F. Wicks, Raymond Bag Co.; Roy Bossolt, The Terre Co.; Tom Athey, Raymond Bag Co.

♦ Row 5 Seated at the head table at Tuesday night's banquet session were the following: front row, Professor Gordon Nance, Mrs. Raymond Rodgers, Dr. E. T. York, Mrs. Wilbur Renk, Dr. Rodgers, Mrs. York, Wilbur Renk and Mrs. Nance. Back row, Susan Prindeville, Paul T. Truitt, Mrs. Russell Coleman, True D. Morse, Mrs. Edwin Pate, C. T. Prindeville, Mrs. Prindeville, Edwin C. Pate, Mrs. Morse, Mrs. Truitt, Dr. Coleman and Jane Prindeville.

individuals; economical and not over-centralized Government) than the correction of these two deficiencies in our machinery of freedom—the method of voting for our Presidents, and the party organizations by which we nominate and elect our Presidents."

Senator Mundt said that "we can have the kind of America we want—but to do so will require the modernization of our political machinery so that the desires of free Americans can be faithfully reflected by our voting procedures and our party organizations."

Dr. Rodgers, who followed Sen. Mundt on Tuesday's program, said that "the American economy has lost its strong upward surge."

Speaking on "The Current Economic Outlook for Business," the nationally-known economist concluded that:

"The constant increase in the cost of doing business is bound to have an effect on the purchasing power of the dollar. The process of inflation, in all probability, will continue, although not at the same rate as in 1956.

"Continuation of the increase in the cost of production and decline in the value of the dollar will cause further mergers and liquidations. Moreover, it makes it advisable for corporations to finance their capital requirements through bonds rather than through equities."

Dr. Rodgers said that "obviously, it is not possible to foretell with any certainty when the forces of inflation will come to an end."

"In fact," he continued, "as of now, the 'cards are stacked' against such a development, as the following upward pressures indicate:

"There is a strong inflation bias in government, as is evidenced by the large expenditures of the Federal government, the farm price policy, stockpiling, etc. All these factors obviously contribute to inflationary pressures.

"It costs more to secure many raw materials since some of the best sources of such materials have been used up. A good example is the growing extent to which American industry has to go far afield to obtain iron ore.

"The cost of transporting goods is rising and this, apparently, will continue.

"Organized labor has adopted a policy of demanding an increase in wages and more and more fringe benefits each year. The cost of doing business therefore, despite the efforts of management to increase efficiency, will not only remain high but will continue to increase.

"Interest rates and corporate taxes also are elements of cost which, wherever possible are shifted to the ultimate consumer. Corporate taxes are very high, and while it is possible that in the foreseeable future the corporate tax rate may go down to 50 per cent, anything much below that level cannot be expected for a long time. It is also fairly certain that interest rates will not go back to the levels of 1934–1951."

EXPANSION PROGRAM

The membership of the National Plant Food Institute in voting for the enabling amendments to the by-laws to permit the expansion activities didn't act on impulse. The program had been recommended by the Board of Directors after more than a year of study of opportunities for market expansion.

The plan envisions a vastly expanded program by the institute in the fields of research, farm demonstrations, education and promotion. The first step, according to Dr. Russell Coleman, executive vice president of the Institute will be the employment of four regional managers and the establishment of regional Institute offices. These will be located as follows:

For the Mid-West, possibly in Chicago; for the Far-West, possibly in San Francisco; for the Southeast, possibly in Atlanta; and for the Northeast, (undecided as yet).

Dr. Coleman said that "the objective of the program, in addition to expanding the fertilizer market by speeding up the acceptance of proper fertilizer usage, would be to further enhance the standing of the industry with farmers, agricultural workers and the general public.

"The fertilizer industry has a capacity to produce substantially more plant food than it is now selling. Yet agricultural leaders say that fertilizer usage should be at least twice the present consumption.

"Efficient use of fertilizer is one of the best ways farmers can reduce the per unit cost of production and the expansion program will enable us to focus greater attention on the plant food needs of farmers, all in keeping with the recommendations of the agricultural colleges."

Dr. Coleman said that a "unified program of action" under the direction of the Institute will include three projects:

To broaden and strengthen fertilizer research through increased grants to universities and colleges.

To initiate a farm demonstration program in cooperation with state and federal agencies.

To develop more specific informational programs based on the results from research and demonstrational projects.

"The plan will be principally concerned with developing the present market potential," he said. "Farm demonstrations conducted in local areas will give the Institute information on which it can project a broad localized informational program. It is the purpose of this program to enlist the cooperation of local newspapers, radio and television stations, agricultural publications, bankers, dealers, professional agricultural workers and others to tell the fertilizer story based on agronomic and economic information."

Dr. Rodgers said that "the cost of doing business must be expected to rise," and added that "nonetheless, it must be frankly faced that when the cost of doing business goes up, although keen competition may squeeze profits, this cannot go on indefinitely, as the profit margin is soon exhausted under such circumstances."

To stop inflation, he pointed out that two principal forces at the disposal of the government are "fiscal discipline and monetary discipline."

"Fiscal discipline means, primarily, that the government in periods of good business activity has a substantial budget surplus which it uses to reduce the public debt," he said. "As such discipline has not been practiced since 1953, it is not likely to be invoked willingly in the future."

Dr. Rodgers said that "no central bank in a democracy such as ours would dare to adopt such drastic credit restrictive measures that large-scale unemployment would be inevitable."

Carroll P. Streeter, Editor of FARM JOURNAL, Philadelphia, and Bill Kennedy, Editor of THE GEORGIA FARMER, Atlanta, were presented awards for "superior journalistic contributions toward the building of the soils of our nation" by the National Plant Food Institute.

Editors Streeter and Kennedy were winners in the Institute's nationwide "Soil Builders Award for Editors" contest in a field of 32 magazine entries. The contest was established in 1952, with the approval of the American Agricultural Editors' Association.

C. T. Prindeville, President of the Institute, presented the awards.

The Board of Directors of the National Plant Food Institute elected C. T. Prindeville, Chicago, as chairman of the Board, and John A. Miller, Louisville, Ky., as president of the organization for the fiscal year 1957–58. Mr. Prindeville is vice president of Swift & Company, and Mr. Miller is president of Price Chemical Company.

The Board re-elected Russell Coleman and Paul T. Truitt as executive vice presidents; W. R. Allstetter as vice president; Louis H. Wilson as secretary; and William S. Ritnour as treasurer; all of Washington, D. C.

Members of the Executive Committee elected are: C. T. Prindeville, Swift & Company, Chicago; E. A. Geoghegan, The Southern Cotton Oil Company, New Orleans; Marlin G. Geiger, W. R. Grace & Co., New York; John A. Miller, Price Chemical Company, Louisville, Ky.; Ralph B. Douglass, Smith-Douglass Company, Norfolk, Va.; H. A. Parker, Sylacauga Fertilizer Company, Sylacauga, Alabama; Dean Gidney, United States Potash Company Division of U. S. Borax & Chemical Corp., New York; John Christian, Inorganic Chemicals Division of Monsanto Chemical Company, St. Louis, Mo.; L. D. George, Richmond Guano Company, Richmond, Va.

FIVE POTASH COMPANIES PROTEST FINANCING PLAN FOR INSTITUTE EXPANSION — NPFI TO STUDY DUES STRUCTURE

G. Fred Coope, president of the Potash Company of America and a director of NPFI declared in a statement read before the business meeting of the Institute that the added costs of implementing and continuing an expanded program for the Institute would place an "additional burden" on the potash producers who support the American Potash Institute.

Mr. Coope said that, "We cannot accept the inequitable allocation of costs of this proposal," and then added, "if it is adopted, my company intends to submit its resignation from the Plant Food Institute."

Mr. Coope also indicated that he was speaking for the following potash producers: American Potash & Chemical Corp.; Duval Sulphur & Potash Co.; National Potash Co.; Southwest Potash Corp.; and U. S. Potash Co., a division of U. S. Borax & Chemical Corp.

Louis Ware, president of International Minerals & Chemicals Corp., said that his company was not a member of the American Potash Institute and that they were in favor of the expansion program, stating it is needed by NPFI and the industry.

Newly elected president of the Institute John A. Miller, president of Price Chemical Company, said in approving the plan that "It is our sincere hope that the entire industry will join with us in this important program designed for the mutual benefit of the fertilizer industry and the American farmer. Most of the nitrogen and phosphate producers have already agreed to support the expanded program at the increased dues rate. A number of potash companies feel that the dues structure is inequitable as it applies to potash because, they, as members of the American Potash Institute, already are paying a substantial amount into that organization. In this connection the Board of Directors (NPFI) authorized the President to appoint a committee to evaluate the total dues structure of the institute to determine if any inequities exist. Members of the Board stated that they would like to see all potash

companies continue their membership in the Institute for at least a year, pending the study of the dues structure."

Following is the complete statement made by Mr. Coope:

Mr. Chairman, in voting against this proposal, I want to make it very clear that I am not voting against the basic program to encourage use of fertilizer—*that* I heartily endorse. What I am voting against is the distribution of costs. In the first place, the expanded program proposed is designed to help all of us equally and yet the total financial burden is placed solely on the producers of primary plant foods—and the captive tonnage of the primary producers is exempt.

This apportionment of costs is extremely inequitable for the potash producers—or to be more exact, for that great majority of the potash companies who have for years supported the American Potash Institute and currently pay approximately 1¼ per cent of their sales for a program of research, education and promotion which benefits the entire fertilizer industry. This assessment is six times as high as the maximum rate proposed by the N.P.F.I. The Potash Institute program is substantially the same as that now proposed by the Plant Food Institute and is constantly growing in size, cost and effectiveness. In fact, it is of a magnitude comparable to that of the first year of the program now contemplated by the National Plant Food Institute and costs the Potash Institute members more per year than is currently expended by the National Plant Food Institute on all its activities. Because this Potash Institute program exists, the Plant Food Institute program will be that much easier and cheaper; but, I repeat, that the present Potash Institute program is financed by the member potash companies alone.

When my company was told of the current proposal, we studied it with care, and concluded that the basic objective was commendable. However, as we were already deeply committed to the heavy expense of the Potash Institute, we concluded we could not bear the additional burden of this program as presented to us. I understand the other potash companies similarly affected felt the same.

In a meeting between the members of the Special Committee of the Plant Food Institute, and the representatives of the domestic potash producers, the points which have been covered in the foregoing remarks were advanced. Because we favored the basic program, my company even offered to double our present contributions to the Plant Food Institute, but this did not meet the requirements of the current proposal. Other potash producers facing the same dilemma also offered a similar increase in contributions. No reply was made to our arguments, our offer and the statement of our position.

In summary, my company's position is simply that we cannot accept the inequitable allocation of costs of this proposal, and, if it is adopted, my company intends to submit its resignation from the Plant Food Institute. I am told that the other major potash producers, with the exception of one which does not contribute to the American Potash Institue, are of the same view and intend to take the same action.

I assure you that we have come to this conclusion with the greatest regret as we all have the highest regard for the Plant Food Institute and have valued our membership in it. Indeed, if my company is forced to resign for this reason, we would nonetheless be reluctant to withdraw our support and would like to continue our present financial contributions, that is, the same amount we are now paying, on some basis satisfactory to the Institute, such as through an associate membership. I am also authorized to make this statement for the following potash producers as well:

American Potash & Chemical Corporation
Duval Sulphur & Potash Company
National Potash Company
Southwest Potash Corporation
United States Potash Company—Division of U. S. Borax & Chemical Corporation.

The following information relating to the activities and objectives of the American Potash Institute was also released to the press:

The American Potash Institute has, as its primary objective, the development and dessimination of information regarding the correct use of potash. The methods employed in achieving this objective, likewise promote the use of other plant foods in mixed fertilizers; and phosphate and nitrogen, as well as lime and other substances, share equally with potash in the benefits of its program.

The staff of the Potash Institute makes no recommendations of its own but works cooperatively with official agricultural agencies, assisting in the development and support of their programs. They recognize that the full benefits of potash can be realized only when used along with the correct amounts of all the other plant foods. The policy of the Potash Institute is to promote a balanced fertility program, designed to benefit American agriculture and the fertilizer industry.

Among those elected to membership on the Institute's Board of Directors include the nine men shown in the accompanying photo.

Left to right: Thomas M. Ware, D. H. Banks, Sr., John Christian, A. W. Mohr, L. G. Black, R. U. Haslanger, J. E. Totman, Charles W. Baldwin and T. F. Bridgers.

FERTILIZATION APPLICATION METHODS FOR HIGHWAY USE

By Peter Crolius
Nitrogen Division
Allied Chemical & Dye Corp.

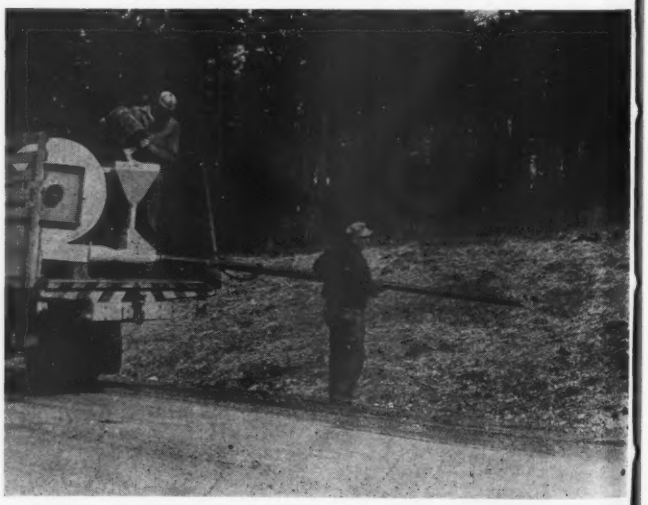
WET: SOLUTIONS—A newcomer to the highway fertilization scene, solutions applicators have been adapted from equipment gaining popularity in agricultural circles. Most solutions used heretofore have been solely nitrogenous, but complete solutions will probably be used more and more in the future. Tanks, pumps, and other solutions attachments can be dismounted from the tractor leaving it free for other work. Solutions application costs are usually less than those for dry materials per unit value. One man operates this rig in use at a Georgia Army base. Swath width is about 20 feet. Spray nozzle on hose is for spot placement. Solutions applicators are available from farm implement dealers.

WITH more and more interest being shown to beautification of roadsides and erosion control on turf areas, equipment used for maintenance fertilizer application is receiving increased attention. Presented on these pages are reviews of five pieces of equipment currently being used by various highway departments and contractors. While the units described are not the only ones in operation, basic principles remain the same.

Fertilizer applicators fall into two categories: applicators of liquid material and applicators of conventional dry material. Newer and more efficient applicators are supplanting conventional equipment as awareness of the beneficial effects of plant foods and the necessity for their use are becoming accepted.

Wet-application equipment includes hydraulic and solutions units. Generally speaking, hydraulic equipment employs dry fertilizer mixed by the user in water at or near the point of use. Solutions applicators use concentrated fertilizer liquids which are manufactured products shipped to the point of application.

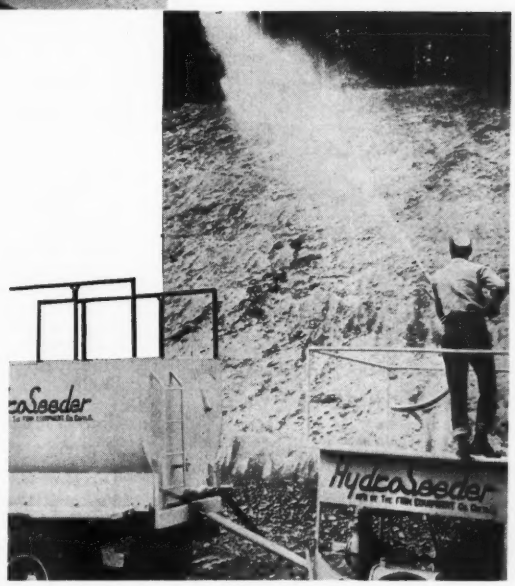
Dry-application equipment includes air blasting or blower units and the conventional farm-type spreaders. (Hand spreading will not be discussed here.) While farm-type spreaders have been used extensively on roadside areas heretofore, they are being replaced by more efficient methods. Air blasting and blower units are recent additions to the field.



DRY: BLOWER—This is not a commercially available machine. The unit shown here was designed and built at the Lynchburg Shops of the Virginia Department of Highways. It uses a high-volume, low-pressure air stream for blowing fertilizer and seed out to 40 feet. A 15-horsepower gasoline engine supplies power for the 36-inch fan. Two men and a truck driver are required to operate the complete unit. At least one applicator manufacturer is considering a highway model for production.

DRY: AIR-BLASTING—Simple to operate, air-blasting units cover eight to ten acres an hour with two guns in operation. A compressor delivering 120 cfm at 90 to 100 pounds is necessary for two-gun operation. Guns (shown at the left) shoot fertilizer over 75 feet. Truck pulls the compressor and carries operators and bagged fertilizer. Air-blasting uses hard-pellet, granular fertilizer and lime only. One man is needed per gun, plus a truck driver. Feeds directly from bag or hopper. Spot placement is easy. Made by Chowning Regulator Corp., Corning, N. Y., price per gun and accessories is under $100.

WET: HYDRAULIC—This unit both seeds and fertilizes. Hydraulic units depend on a readily available source of water. Since plant food materials are dissolved in water, either liquid or dry concentrates may be used. According to manufacturer's statement, hydraulic units will seed and fertilize four to six acres an hour. Requires one operator and driver. Unit spreads water borne fertilizer-seed mixture out to 100 feet. Tank agitator keeps materials (including lime) in suspension. Complete, skid-mounted, 1000-gallon unit for 2½-ton truck costs about $3500 from Finn Equipment Co., Cincinnati 8, O.



1955-56 Fertilizer and Plant Nutrient Consumption in the United States

by

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THE consumption of fertilizers in the United States and territories (Hawaii and Puerto Rico) in the year ended June 30, 1956, amounted to 22,193,070 tons. This was a decrease of 533,392 tons from the quantity (22,726,462 tons) used in the preceding year. The 1955–56 consumption of fertilizers comprised 21,403,465 tons of products containing one or more of the primary plant nutrients (N, P_2O_5, K_2O), and 789,605 tons of the secondary and trace nutrient materials which did not contain these nutrients. The quantity of products containing primary nutrients was 531,391 tons (2.42 per cent) below that (21,934,856 tons) in 1954–55. The consumption of materials that did not contain primary nutrients was 2,001 tons (0.25 per cent) below the quantity (791,606 tons) used in the preceding year.

Fertilizers used in 1955–56 contained 6,054,741 tons of nitrogen, available P_2O_5, and K_2O, or 64,398 tons (1.05 per cent) less than in 1954–55. This was the first time in 17 consecutive years that the total consumption of primary nutrients failed to increase. The use of nitrogen decreased 27,933 tons (1.42 per cent) to 1,932,603 tons, that of available P_2O_5 36,240 tons (1.59 per cent) to 2,247,420 tons, and that of K_2O 225 tons (0.01 per cent) to 1,874,718 tons. The amount of total P_2O_5 increased 46,699 tons (1.80 per cent) to 2,643,418 tons, owing principally to the increase in the direct use of phosphate rock which is estimated to have contained an average of 32 per cent of total P_2O_5 but only 3 per cent of available P_2O_5.

In 1955–56 the average primary nutrient content of fertilizers bearing primary nutrients was 28.29 per cent as compared with 27.90 per cent in 1954–55.

The data presented herein were compiled from manufacturers' reports of shipments to agents, dealers, distributors, and consumers in the territories (except Alaska), the District of Columbia, and the states (except California, Florida, Massachusetts, Missouri, North Carolina, South Carolina, and Texas). For the latter seven states the data were compiled chiefly from the reports of the respective fertilizer control officials. No data were available for Alaska. Supplementary information was furnished by the control offices and other state agencies, as well as by fertilizer brokers, and special inquiries were made of all known distributors and custom applicators of anhydrous ammonia and nitrogen solutions.

The quantities are reported as 2,000-pound tons. Although the data refer to shipments, the terms "consumption," "sales," and "shipments" are used synonymously. The actual consumption differs slightly, no doubt, from either the shipments or sales.

ALL FERTILIZERS

The consumption of the two classes of fertilizers (mixtures and materials) is summarized by states and regions in Table 1. In only two regions—the West South Central and Pacific—were slight gains made, while in the other regions consumption was lower by amounts ranging up to nearly 11 per cent as compared with the preceding year (Table 1a). In 1955–56 approximately 64 per cent of the decrease in fertilizer tonnage occurred in the three Atlantic coast regions. Among the other areas the West North Central

TABLE 1a

Regional change in consumption of fertilizers in year ended June 30, 1956, from that in the preceding year

Region	Tons			Per cent		
	Mixtures	Materials[1]	Total	Mixtures	Materials[1]	Total
New England	− 17,491	− 5,890	− 23,381	− 4.79	− 7.90	− 5.32
Middle Atlantic	−158,999	− 18,517	−177,516	− 8.37	− 8.35	− 8.37
South Atlantic	− 88,742	− 49,700	−138,442	− 1.80	− 4.27	− 2.27
East North Central	−141,796	+139,414	− 2,382	− 4.03	+14.00	− .05
West North Central	−102,598	− 17,376	−119,974	− 7.99	− 1.93	− 5.49
East South Central	− 32,145	− 3,454	− 35,599	− 1.60	− .37	− 1.21
West South Central	− 5,093	+ 7,052	+ 1,959	− .72	+ 1.07	+ .14
Mountain	− 3,423	− 42,330	− 45,753	− 6.67	−11.31	−10.75
Pacific	+ 11,259	+ 37,249	+ 48,508	+ 3.78	+ 1.95	+ 2.20
Continental U. S.	−539,028	+ 46,448	−492,580	− 3.58	+ .64	− 2.21
Territories	− 33,169	− 7,643	− 40,812	−11.86	− 4.77	− 9.28
Total	−572,197	+ 38,805	−533,392	− 3.73	+ .52	− 2.35

[1] Including secondary and trace nutrient materials.

TABLE 1. Consumption of Fertilizers, year ended June 30, 1956[1]

State and Region	Mixtures			Materials[2]			Grand total	Compared with year ended June 30, 1955	
	July 1 - Dec. 31, 1955	Jan. 1 - June 30, 1956	Total	July 1 - Dec. 31, 1955	Jan. 1 - June 30, 1956	Total		Fertilizers 3/	Total N, avail. P_2O_5 & K_2O
	Tons	Tons	Tons	Tons	Tons	Tons	Tons	Percent	Percent
Maine	10,654	167,361	178,015	1,456	3,896	5,352	183,367	101	103
New Hampshire	1,622	10,553	12,175	1,317	2,835	4,152	16,327	89	89
Vermont	3,098	29,458	32,556	10,375	7,768	18,143	50,699	104	106
Massachusetts	9,350	49,158	58,508	4,340	11,426	15,766	74,274	87	86
Rhode Island	1,412	11,709	13,121	354	1,431	1,785	14,906	90	87
Connecticut	6,845	46,350	53,195	4,421	19,068	23,489	76,684	87	91
New England	32,981	314,589	347,570	22,263	46,424	68,687	416,257	95	98
New York	111,267	381,250	492,517	26,455	54,953	81,408	573,925	91	93
New Jersey	43,806	195,357	239,163	6,429	16,711	23,140	262,303	92	94
Pennsylvania	170,294	414,943	585,237	21,699	45,625	67,324	652,561	92	95
Delaware	12,921	67,730	80,651	1,034	3,692	4,726	85,377	89	93
District of Columbia	449	1,326	1,775	297	469	766	2,541	90	92
Maryland	66,983	198,673	265,656	5,475	10,270	15,745	281,401	88	89
West Virginia	16,167	58,718	74,885	3,292	6,712	10,004	84,889	104	104
Middle Atlantic	421,887	1,317,997	1,739,884	64,681	138,432	203,113	1,942,997	92	94
Virginia	150,983	521,580	672,563	20,675	84,626	105,301	777,864	96	97
North Carolina	200,189	1,150,965	1,351,154	49,003	301,261	350,264	1,701,418	92	92
South Carolina	89,212	525,991	615,203	30,865	218,022	248,887	864,090	93	97
Georgia	178,973	820,141	999,114	54,816	217,126	271,942	1,271,056	99	103
Florida	505,789	695,672	1,201,461	54,038	83,480	137,518	1,338,979	109	109
South Atlantic	1,125,146	3,714,349	4,839,495	209,397	904,515	1,113,912	5,953,407	97	99
Ohio	293,150	692,167	985,317	16,588	48,226	64,814	1,050,131	97	97
Indiana	229,030	691,973	921,003	26,408	116,572	142,980	1,063,983	92	97
Illinois	146,542	368,395	514,937	365,146	480,375	845,521	1,360,458	112	98
Michigan	172,897	405,834	578,731	13,026	36,241	49,267	627,998	98	103
Wisconsin	65,242	314,619	379,861	9,871	22,542	32,413	412,274	96	102
East North Central	906,861	2,472,988	3,379,849	431,039	703,956	1,134,995	4,514,844	100	99
Minnesota	47,788	241,535	289,323	15,469	63,316	78,785	368,108	98	102
Iowa	82,805	223,038	305,843	49,143	94,320	143,463	449,306	77	77
Missouri	180,880	273,888	454,768	179,345	176,296	355,641	810,409	119	105
North Dakota	2,866	20,992	23,858	7,981	37,329	45,310	69,168	110	115
South Dakota	1,737	7,684	9,421	4,210	12,969	17,179	26,600	70	76
Nebraska	3,708	16,802	20,510	22,196	90,284	112,480	132,990	64	79
Kansas	48,509	29,565	78,074	68,113	61,557	129,670	207,744	89	93
West North Central	368,293	813,504	1,181,797	346,457	536,071	882,528	2,064,325	94	92
Kentucky	61,565	370,689	432,254	28,074	74,807	102,881	535,135	102	105
Tennessee	88,799	321,409	410,208	29,888	76,043	105,931	516,139	97	103
Alabama	126,327	679,496	805,823	69,162	223,909	293,071	1,098,894	95	99
Mississippi	19,648	312,768	332,416	175,589	242,217	417,806	750,222	104	105
East South Central	296,339	1,684,362	1,980,701	302,713	616,976	919,689	2,900,390	99	103
Arkansas	29,879	145,352	175,231	29,882	158,206	188,088	363,319	109	117
Louisiana	29,922	133,602	163,524	34,108	105,853	139,961	303,485	95	100
Oklahoma	34,604	41,928	76,532	34,912	24,060	58,972	135,504	107	110
Texas	87,671	200,131	287,802	106,122	172,579	278,701	566,503	96	107
West South Central	182,076	521,013	703,089	205,024	460,698	665,722	1,368,811	100	108
Montana	903	2,834	3,737	10,010	19,221	29,231	329,968	137	135
Idaho	426	4,956	5,382	14,846	44,191	59,037	64,419	57	70
Wyoming	66	1,773	1,839	1,078	8,062	9,140	10,979	100	98
Colorado	2,752	9,289	12,041	8,400	33,109	41,509	53,550	111	112
New Mexico	314	1,517	1,831	5,169	21,990	27,159	28,990	89	92
Arizona	3,788	13,685	17,473	53,562	82,529	136,091	153,564	94	103
Utah	576	3,950	4,526	3,359	23,099	26,458	30,984	111	117
Nevada	477	570	1,047	1,152	2,083	3,235	4,282	176	166
Mountain	9,302	38,574	47,876	97,576	234,284	331,860	379,736	90	99
Washington	6,052	29,902	35,954	47,423	86,462	133,885	169,839	85	90
Oregon	4,550	21,900	26,450	30,099	113,394	143,493	169,943	99	100
California	85,351	161,143	246,494	691,527	975,582	1,667,109	1,913,603	107	110
Pacific	95,953	212,945	308,898	769,049	1,175,438	1,944,487	2,253,385	104	106
Continental U. S.	3,438,838	11,090,321	14,529,159	2,448,199	4,816,794	7,264,993	21,794,152	98	99
Hawaii	34,782	30,603	65,385	40,941	59,758	100,699	166,084	106	107
Puerto Rico	72,293	108,816	181,109	19,498	32,227	51,725	232,834	82	84
Alaska[4]	---	---	---	---	---	---	---	---	---
Territories	107,075	139,419	246,494	60,439	91,985	152,424	398,918	90	93
Total: 1955-56	3,545,913	11,229,740	14,775,653	5/2,508,638	6/4,908,779	7,417,417	22,193,070	98	99
1954-55	3,621,898	11,725,952	15,347,850	5/2,504,621	6/4,873,991	7,378,612	22,726,462	100	100
1953-54	3,370,022	12,171,054	15,541,076	2,603,399	4,629,024	7,232,423	22,773,499	101	99

1/ Includes: Ground phosphate rock, basic slag, secondary and trace nutrient materials, such as, borax, sulfur, magnesium sulfate, etc., used as separate materials, also fertilizers distributed by Government agencies. Does not include liming materials, but includes gypsum. 2/ Does not include the quantities of materials used for manufacture of commercial mixtures. 3/ Fertilizers which were guaranteed to contain one or more of the primary plant nutrients (N, P_2O_5, K_2O). 4/ Data not available - estimated less than 1500 tons. 5/ Revised by deletion of 737 tons of basic slag from Pennsylvania total and addition of 6,426 tons of gypsum to North Carolina total. 6/ Revised by deletion of 7,804 tons of basic slag from Pennsylvania total and addition of 4,872 tons of gypsum to North Carolina total.

region accounted for the highest proportion (22.5 per cent) of the decrease.

In Hawaii and in each of 16 states scattered through every region the consumption of all fertilizers was higher in 1955–56 than in the preceding year. These units, which in 1955–56 accounted for 35.52 per cent of the United States consumption of fertilizer, showed a total gain of 587,222 tons (7.45 per cent) over their consumption in 1954–55.

Compared with the tonnages in each six-month period of 1954–55, most of the decrease in total consumption of fertilizers occurred in the January-June period of 1955–56. Consumption in this period was 461,424 tons (2.78 per cent) lower, while in the July-December period consumption was 71,968 tons (1.17 per cent) lower.

In Table 1, the percentage change in consumption of fertilizers in 1955–56 from the level in 1954–55 is based on the tonnage of primary nutrient containing fertilizers only, in order that a direct comparison may be made with the percentage change in the quantities of the primary nutrients themselves.

MIXTURES

In 1955–56 the total consumption of commercial mixed fertilizers amounted to 14,775,653 tons, or 66.58 per cent of the quantity of fertilizers. There were 1,536 grades reported. In addition, approximately 500 mixtures, not reported by grades, were used in California and the quantities of an unknown number reported by manufacturers in other states.

The total consumption of mixed fertilizers in 1955–56 was 572,197 tons (3.73 per cent) less than in the preceding year (Table 1a), and the quantity decreased in each of the regions except the Pacific which showed an increase of 3.78 per cent.

In the Continental United States, there were 171 grades consumed in individual amounts of 3,000 tons or more (Table 2). These totaled 13,973,318 tons and accounted for 96.17 per cent of the quantity of mixtures used on the continent. Other grades consumed in this area numbered 1,231 and amounted to 358,045 tons (2.46 per cent). The balance (197,796 tons, 1.37 per cent) represented mixtures not reported by grades.

Consumption of mixtures in Hawaii and Puerto Rico amounted to 246,494 tons in 168 grades. While many of the grades in Puerto Rico are similar to those used on the continent, most of those in Hawaii are designated in fractional numbers.

In 1955–56, four ratios of the primary nutrients (N: available P_2O_5:K_2O) accounted for 50.63 per cent of the total consumption of mixed fertilizers in the Continental United States (Table 2a). Individually, the proportions were 17.42, 13.88, 10.86, and 8.47 per cent for the 1:4:4, 1:2:2, 1:1:1, and 1:3:3 ratios, respectively.

TABLE 2. Consumption of Principal Mixed Fertilizers in the Continental United States, by Grades, years ended June 30, 1955 and 1956

Grade	Consumption[1]		Proportion of total		*Grade	Consumption[1]		Proportion of total	
	1955	1956	1955	1956		1955	1956	1955	1956
	Tons	Tons	Percent	Percent		Tons	Tons	Percent	Percent
0-8-24	5,115	5,540	0.03	0.03	6-9-10	0	4,094	0	.03
0-9-27	16,685	11,816	.11	.08	6-9-12	51,069	36,971	.34	.25
0-10-10	2,965	3,547	.02	.03	6-10-4	71,995	77,937	.48	.54
0-10-20	55,695	62,640	.37	.43	6-10-8	3,629	5,819	.02	.04
0-10-30	45,605	41,660	.30	.29	6-12-4	3,278	3,944	.02	.02
0-12-12	28,720	20,064	.19	.13	6-12-6	51,456	41,708	.34	.29
0-12-20	11,983	16,373	.08	.12	6-12-12	280,573	334,595	1.86	2.30
0-12-36	7,691	10,707	.05	.07	6-12-15	2,212	3,360	.02	.03
0-14-10	5,108	3,394	.04	.02	6-12-18	2,516	6,610	.02	.04
0-14-14	129,982	174,442	.86	1.21	6-18-6	588	3,215	(2/)	.02
0-15-30	16,380	15,256	.11	.10	6-18-18	2,491	8,834	.02	.07
0-15-45	3,154	4,879	.02	.03	6-20-20	4,501	4,499	.03	.03
0-16-8	25,190	46,697	.17	.33	6-24-0	13,377	7,909	.09	.05
0-20-10	16,079	11,335	.10	.07	6-24-12	65,377	84,454	.43	.58
0-20-20	341,795	310,275	2.27	2.14	6-24-24	22,433	44,673	.15	.31
0-24-24	7,522	8,912	.05	.06	7-7-7	29,851	24,767	.20	.17
0-25-25	10,133	17,837	.07	.12	7-8-8	5,705	7,705	.03	.05
0-30-15	9,255	11,587	.06	.08	7-9-9	3,366	3,737	.03	.03
0-30-30	18,623	20,984	.13	.15	7-14-7	2,733	3,902	.01	.03
2-10-8	6,173	4,150	.04	.03	8-0-8	16,007	12,278	.11	.08
2-12-6	44,391	27,196	.29	.18	8-0-12	6,465	5,820	.04	.04
2-12-12	438,393	400,811	2.91	2.76	8-0-24	20,395	21,111	.14	.15
2-8-8	12,006	9,173	.08	.06	8-1-1	1,580	12,252	.01	.08
3-9-6	494,506	367,517	3.28	2.53	8-4-6	2,108	6,150	.01	.04
3-9-9	494,438	478,163	3.28	3.29	8-4-8	41,629	37,168	.28	.26
3-9-12	28,624	33,474	.19	.24	8-6-4	5,610	6,908	.04	.05
3-9-15	11,291	8,400	.08	.05	8-6-6	4,159	4,004	.02	.02
3-9-18	80,324	70,990	.53	.49	8-6-8	3,721	20,496	.03	.14
3-9-27	109,446	95,000	.73	.66	8-8-4	19,033	16,218	.13	.12
3-12-6	210,639	152,357	1.40	1.04	8-8-8	226,634	207,967	1.50	1.43
3-12-12	1,413,525	1,171,479	9.38	8.07	8-9-10	7,641	8,164	.05	.06
3-18-9	50,074	41,699	.33	.28	8-10-12	11,976	11,169	.08	.07
4-4-2	3,013	5,050	.02	.04	8-12-12	39,478	55,748	.26	.39
4-6-6	11,965	8,503	.08	.06	8-12-16	17,501	16,119	.12	.11
4-6-8	43,472	38,981	.29	.27	8-16-8	5,860	6,189	.04	.04
4-7-5	117,706	115,248	.78	.79	8-16-16	126,175	140,341	.83	.97
4-8-4	12,799	11,311	.08	.08	8-24-0	2,624	4,479	.02	.03
4-8-6	248,738	190,357	1.65	1.31	8-24-8	85,837	72,908	.57	.51
4-8-8	280,857	219,923	1.87	1.51	8-24-12	9,418	13,576	.06	.09
4-8-10	97,526	115,008	.64	.79	8-32-0	63,110	60,377	.42	.42
4-8-12	56,399	53,139	.38	.37	9-6-6	10,089	10,609	.07	.07
4-9-3	69,566	63,442	.46	.43	9-9-9	3,873	10,906	.03	.07
4-10-6	424,671	368,797	2.82	2.54	9-36-0	3,324	3,006	.02	.02
4-10-7	640,994	469,543	4.25	3.23	10-0-8	2,204	4,020	.01	.03
4-10-8	2,365	3,071	.02	.03	10-0-10	29,688	22,687	.20	.16
4-10-10	8,649	10,697	.06	.07	10-0-12	4,714	3,700	.03	.02
4-12-4	104,024	84,300	.69	.58	10-2-10	1,010	5,504	.01	.04
4-12-8	149,971	146,648	.99	1.01	10-4-10	3,753	4,808	.02	.03
4-12-12	501,692	737,215	3.33	5.07	10-5-5	3,067	3,657	.02	.03
4-12-16	3,514	3,071	.03	.02	10-6-4	42,540	42,175	.27	.29
4-16-8	30,901	23,225	.20	.16	10-10-0	8,703	8,445	.06	.06
4-16-16	702,756	615,596	4.66	4.24	10-10-5	23,529	22,569	.16	.15
4-24-12	38,088	24,865	.26	.17	10-10-10	725,133	659,090	4.81	4.54
5-3-6	3,802	3,559	.02	.03	10-15-15	4,824	6,108	.03	.04
5-5-5	6,912	3,191	.05	.02	10-16-8	7,661	8,274	.05	.06
5-5-8	6,551	7,085	.04	.05	10-20-0	102,526	63,825	.68	.44
5-6-6	3,535	3,719	.03	.02	10-20-10	86,642	121,165	.58	.83
5-6-8	12,764	9,399	.08	.07	10-20-20	15,143	23,440	.10	.16
5-7-5	21,400	22,008	.14	.15	10-30-10	5,211	4,684	.03	.04
5-8-5	1,641	3,964	.01	.03	11-48-4	3,131	4,891	.02	.03
5-8-7	14,311	10,294	.10	.07	12-0-10	19,820	13,570	.13	.09
5-8-8	3,653	5,307	.02	.03	12-0-12	5,965	7,832	.04	.06
5-10-5	764,044	678,083	5.07	4.67	12-6-6	5,683	7,150	.04	.05
5-10-10	1,379,753	1,296,912	9.16	8.93	12-12-12	306,858	500,839	2.04	3.44
5-10-15	111,158	128,086	.74	.88	12-24-12	27,127	26,762	.18	.19
5-10-20	8,761	8,589	.06	.06	12-36-12	1,750	4,729	.01	.03
5-10-30	377	3,317	(2/)	.02	12-24-0	8,272	4,597	.06	.03
5-15-10	7,718	3,980	.05	.03	13-13-13	31,459	38,058	.20	.26
5-15-15	18,010	6,009	.12	.04	14-0-7	0	11,641	0	.08
5-15-30	5,310	6,298	.03	.04	14-0-14	46,804	47,436	.31	.33
5-20-10	55,880	58,433	.37	.41	14-14-14	33,782	43,913	.23	.30
5-20-20	564,263	699,511	3.75	4.81	15-0-12	3,549	3,181	.02	.02
5-40-0	0	5,966	0	.04	15-0-15	4,043	4,902	.03	.04
6-3-6	23,415	14,094	.15	.10	15-8-4	6,731	7,815	.04	.05
6-4-6	15,292	19,139	.11	.13	15-15-0	59,637	31,462	.37	.22
6-4-8	38,744	43,944	.25	.30	15-30-0	2,958	4,174	.02	.03
6-4-12	924	3,963	.01	.03	16-8-8	3,313	3,052	.02	.02
6-6-6	77,098	85,327	.51	.59	16-10-0	7,775	4,996	.06	.03
6-6-8	16,469	31,430	.11	.21	16-48-0	236	5,098	(3/)	.04
6-6-12	11,490	9,934	.08	.07	17-7-0	17,813	16,139	.12	.11
6-6-18	13,616	11,070	.09	.08	20-0-20	7,399	6,417	.05	.04
6-7-7	4,757	4,126	.03	.03					
6-8-4	2,938	5,281	.02	.03					
6-8-6	123,438	104,043	.82	.72	171 Listed grades	14,504,643	13,973,318	96.26	96.17
6-8-6	159,826	123,735	1.06	.85	Other grades reported	3/ 435,397	4/ 358,045	2.88	2.46
6-8-8	264,902	268,288	1.76	1.85	Not reported by grade	128,147	197,796	0.86	1.37
6-8-12	23,125	24,559	.15	.17	Total	5/ 15,068,187	5/ 14,529,159	100.00	100.00
6-9-3	5,708	5,280	.04	.03					
6-9-6	8,963	8,802	.06	.06					
6-9-9	6,329	3,601	.04	.03					

1/ Grades consumed in amounts of 3,000 tons or more in year ended June 30, 1956 and their consumption in year ended June 30, 1955. 2/ Less than 0.005 percent. 3/ 1,171 grades. 4/ 1,231 grades. 5/ Does not include the quantity of mixtures consumed in the Territories.

TABLE 2a

Ratios of primary nutrients of mixed fertilizers consumed in largest tonnage in the Continental U. S., year ended June 30, 1956

Nutrient ratio[1]	Consumption	Proportion of quantity of all mixed fertilizers
	tons	per cent
1:4:4	2,531,259	17.42
1:2:2	2,017,105	13.88
1:1:1	1,578,374	10.86
1:3:3	1,230,328	8.47
Total	7,357,066	50.63

[1] N:available P_2O_5:K_2O.

The 15 grades consumed in largest tonnages in 1955–56 in each of the continental regions and Puerto Rico are shown in Table 3, together with the quantities for each state in the region. Excepting California, Colorado, Washington, Wyoming, and the District of Columbia, these grades accounted for 50 per cent or more of the total consumption of mixtures in each of the states and Puerto Rico. At least 12 of the grades were among the 15 consumed in largest tonnages in each of the areas in the preceding year, but not always in the same order of tonnage.

Though 171 grades consumed in the Continental U. S. represented 96.17 per cent of the total tonnage of mixed fertilizers used in this area, 15 of these (Table 3) accounted for 62.56 per cent of the tonnage. These 15 were the same as those in 1954–55 except that the 6-12-12 grade replaced the 4-8-8 grade. The weighted average guaranteed nutrient content of the 15 grades was 4.80

per cent nitrogen, 12.12 per cent available P_2O_5, and 11.30 per cent K_2O (total, 28.22 per cent) as compared, respectively, with 4.51, 11.80, and 10.86 per cent (total, 27.17 per cent) in the preceding year. The proportionate increase in the concentration of nitrogen and potash were higher than in that of P_2O_5.

In 1955–56 the 5-10-10 grade was consumed in largest tonnage, while in each of the preceding 6 years the 3-12-12 grade showed the largest consumption.

The consumption of mixtures by classes (N-P-K, N-P, P-K, N-K) for each region and the United States is shown in Table 5. Except for the Mountain region, N-P-K mixtures were used in much larger quantities than the other classes. More than 80 per cent of the tonnage of all mixtures consumed in each of the other regions was of this class, while in the Mountain region the tonnages of N-P-K and N-P mixtures were nearly equal. In 1955–56 for the United States and territories, 90.80 per cent of the tonnage of all mixtures was of the N-P-K class, while for the other classes—N-P, P-K, N-K—consumption was 1.96 per cent, 5.73 per cent, and 1.51 per cent of the total tonnage, respectively. The proportions were only slightly different in 1954–55.

The average primary nutrient content of all mixtures consumed in each state and territory is shown in Table 7. Compared with 1954–55 the averages for the 51 political units in 1955–56 showed for nitrogen, increases in 38 and decreases in 13; for available P_2O_5, increases or no change in 42 and decreases in 9; for K_2O, increases in 41 and decreases in 10; and for all these nutrients, increases in 44 and decreases in 7. The West South Central region was the only area in which the average content of each of the nutrients showed an increase.

The national weighted average of the primary nutrients contained in mixed

TABLE 3. Consumption of Mixed Fertilizers, by grades in each State and Region, year ended June 30, 1956

State	Fifteen principal grades consumed in region, Tons															All other grades: Number 1/	All other grades: Tons 2/	Total tons
New England																		
	8-12-12	5-10-10	6-9-12	10-10-10	8-16-16	8-12-16	0-20-20	6-3-6	5-8-7	8-9-10	7-7-7	10-15-15	0-15-30	6-10-4	5-10-5			
Maine	51,077	12,795	36,886	11,243	12,150	16,071	745	0	2,134	8,164	475	6,048	93	303	224	40	19,607	178,015
New Hampshire	585	2,528	0	1,450	3,436	0	383	15	666	0	498	0	1,015	542	102	27	955	12,175
Vermont	187	6,127	0	3,434	5,917	0	12,293	0	129	0	394	0	2,064	70	187	26	1,754	32,556
Massachusetts	847	14,057	0	7,302	4,450	0	596	4,536	4,518	0	3,344	0	960	2,875	2,199	33	12,824	56,508
Rhode Island	258	7,111	0	585	185	0	271	0	521	0	594	0	153	442	195	25	2,806	13,121
Connecticut	1,203	10,092	0	5,614	2,200	0	1,246	8,095	2,244	0	2,165	0	1,695	1,565	2,065	61	15,081	53,195
Total	54,157	52,710	36,886	29,628	28,338	16,071	15,534	12,576	10,212	8,164	7,470	6,048	5,980	5,797	4,972	93	53,027	347,570
Middle Atlantic																		
	5-10-10	5-10-5	10-10-10	3-12-6	8-16-16	0-20-20	6-12-6	2-12-12	4-8-12	6-12-12	3-12-12	4-12-12	0-14-14	8-8-8	5-10-15			
New York	153,338	114,040	60,489	6,821	34,928	14,771	31,912	35	4,035	12,703	3,006	7	2,292	4,116	6,916	71	43,108	492,517
New Jersey	124,253	24,109	8,075	1,517	1,484	2,416	1,783	15	325	3,539	1,685	531	2,362	13,562	1,763	70	51,744	239,163
Pennsylvania	262,587	22,268	57,483	71,519	24,578	29,453	2,145	6,761	8,176	7,811	11,248	18,359	5,955	1,173	2,423	106	53,298	585,237
Delaware	38,521	1,299	6,663	1,230	3,598	1,817	0	4,937	1,081	1,576	1,791	1,233	2,951	263	5,936	60	7,761	80,651
District of Columbia	36	644	19	0	0	0	0	0	4	0	0	0	0	106	0	17	962	1,775
Maryland	68,827	24,031	15,587	36,861	4,163	5,359	6	16,261	14,931	1,720	9,680	5,118	5,520	1,676	1,611	86	34,305	265,656
West Virginia	11,143	2,688	1,122	11,916	256	5,492	0	2,990	1	563	279	151	2,849	13	82	46	11,340	74,885
Total	700,705	189,079	151,438	129,864	69,001	59,308	35,846	30,999	28,553	27,916	27,689	25,399	21,929	20,909	18,731	175	202,518	1,739,884
South Atlantic																		
	4-12-12	3-9-9	5-10-10	4-10-6	2-12-12	3-9-6	4-8-8	4-8-6	5-10-5	4-7-5	4-8-10	0-14-14	3-12-12	6-8-6	6-6-6			
Virginia	9,579	42,610	133,775	98	193,709	41,071	2	0	64,355	0	7,170	30,586	41	11,234	0	52	138,333	672,563
North Carolina	8,741	209,594	208,464	231,254	147,158	223,851	0	0	16,252	0	68,923	10,374	0	49,922	0	22	180,621	1,354,154
South Carolina	27,267	146,667	18,144	136,606	0	25,526	17,598	0	48,483	0	0	41,155	80,028	2,842	0	23	70,787	615,003
Georgia	514,091	74,563	7,684	47	19,668	1,502	111,203	149,744	4,845	95	0	2,659	2,187	15,199	0	97	95,687	995,114
Florida	24,073	7,389	4,642	774	4,751	0	77,299	40,442	6,934	115,153	38,672	6,510	5,177	7,647	84,966	837	777,092	1,201,461
Total	583,751	476,763	372,649	368,779	365,286	292,050	206,102	190,186	140,869	115,248	114,765	91,284	87,433	86,844	84,966	911	1,262,520	4,839,495
East North Central																		
	3-12-12	4-16-16	5-20-20	10-10-10	12-12-12	0-20-20	5-10-10	3-9-27	3-18-9	0-10-30	6-12-12	3-9-18	6-24-24	8-16-16	6-10-4			
Ohio	413,840	57,645	109,253	71,772	58,478	31,066	108,560	1,145	14,730	1,989	15,072	6,990	2,041	17,070	7,449	87	68,217	985,317
Indiana	171,610	252,650	143,898	98,771	76,252	44,089	3,236	23,720	5,317	10,990	5,015	2,620	9,055	2,925	3,187	103	67,668	921,003
Illinois	97,665	102,175	52,871	84,229	44,954	18,944	243	29,577	718	3,222	5,262	2,866	7,165	373	3,433	96	61,840	514,937
Michigan	136,789	104,209	102,244	40,140	77,061	17,909	4,186	3,382	19,912	3,266	8,630	3,618	864	1,200	6,837	81	48,544	578,731
Wisconsin	69,704	51,280	94,607	30,304	5,509	34,255	0	18,318	957	18,813	3,937	11,704	5,808	2,226	0	57	32,439	379,861
Total	889,608	567,959	502,873	325,216	262,254	146,283	116,225	76,062	41,634	38,280	37,916	27,198	24,933	23,794	20,906	179	278,708	3,379,849
West North Central																		
	12-12-12	5-20-20	6-24-12	3-12-12	8-24-8	10-10-10	0-20-20	5-20-10	8-32-0	4-12-4	4-16-16	10-20-0	8-8-8	15-15-0	8-16-16			
Minnesota	3,627	71,656	62,070	1,965	0	10,852	23,670	7,940	9,110	0	22,757	1,759	39	251	14,909	74	58,718	289,323
Iowa	20,422	69,648	4,366	12,712	601	28,723	9,623	40,890	13,277	64	9,737	14,112	331	7,028	1,119	204	53,190	305,843
Missouri	152,500	12,936	0	53,337	44,884	19,631	16,123	5	0	36,178	6,425	3,709	31,513	3,002	0	28	74,525	454,768
North Dakota	247	500	3,396	103	5	276	47	136	8,556	0	233	84	0	180	571	51	9,582	23,858
South Dakota	102	17	336	13	33	102	45	13	3,105	1	1	2,210	0	1,215	20	46	2,208	9,421
Nebraska	206	100	48	0	166	162	426	102	3,960	32	0	3,374	10	3,269	0	71	8,655	20,510
Kansas	3,848	606	7	833	21,208	964	635	0	3,213	4,450	117	13,655	496	8,003	68	56	19,971	78,074
Total	180,952	175,463	70,225	68,963	66,897	60,710	50,569	49,086	41,221	40,725	39,270	38,903	32,389	22,948	16,687	259	226,789	1,181,797
East South Central																		
	4-10-7	6-12-12	6-8-8	4-12-12	5-10-5	6-8-4	5-10-15	4-12-8	3-9-6	3-12-12	0-14-14	0-16-8	5-10-10	6-8-6	10-10-10			
Kentucky	0	17,753	41	159	1,907	0	84,569	84,951	17,409	50,449	917	0	21,579	30,833	22,766	71	98,921	432,254
Tennessee	1,524	218,712	2,541	2,103	3,973	1,394	12,134	7,322	58,041	16,449	248	0	8,266	883	3,734	99	72,484	410,208
Alabama	414,558	156	42,518	124,894	1,838	94,786	0	0	2	0	50,526	40,006	82	28	404	36	36,085	805,823
Mississippi	4,719	1,856	167,963	17	99,361	1,386	0	0	0	2,084	5,482	625	8,686	77	695	38	37,265	330,216
Total	420,801	238,477	213,463	127,173	107,079	99,766	96,703	92,273	75,452	68,982	57,173	40,631	38,553	31,821	27,599	143	244,755	1,980,701
West South Central																		
	5-10-5	10-20-10	8-8-8	12-12-12	3-12-12	4-12-4	6-8-12	12-24-12	10-20-0	13-13-13	6-8-8	5-20-20	3-9-18	5-10-10	0-20-20			
Arkansas	46,917	22,013	3,014	11,770	1,815	1,116	22,583	1,430	158	3,547	52	1,456	10,955	1,618	8,343	60	38,444	175,231
Louisiana	25,592	4,106	32,627	18,699	22,555	9,928	711	1,783	1	3,243	12,241	8,044	16	3,156	2,031	43	18,791	163,524
Oklahoma	27,395	17,542	479	365	545	4,703	0	2,934	7,096	331	0	346	1,050	2,147	61	45	11,578	76,532
Texas	118,219	53,698	15,524	3,787	3,221	7,896	170	12,599	11,286	6,138	113	2,194	11	4,326	293	88	48,307	287,802
Total	218,103	97,359	51,644	34,621	28,136	23,643	23,464	18,746	18,541	13,259	12,406	12,040	12,032	11,247	10,728	146	117,120	703,089
Mountain																		
	10-20-0	6-10-4	10-16-8	20-20-0	10-20-5	10-10-10	27-14-0	10-10-0	10-20-10	20-10-0	10-18-5	6-30-0	15-11-0	12-24-0	18-9-0			
Montana	2,126	199	0	0	0	0	80	0	8	0	204	615	0	0	0	21	505	3,737
Idaho	478	142	854	0	0	44	605	40	0	2	458	218	1,020	9	0	31	1,512	5,382
Wyoming	488	44	0	0	0	0	0	16	0	209	12	0	132	0	16	16	938	1,839
Colorado	479	834	1,603	40	0	595	0	265	76	386	205	0	836	0	70	70	6,714	12,041
New Mexico	135	0	0	639	0	76	0	15	102	0	0	0	0	0	0	18	864	1,831
Arizona	2,556	0	0	1,713	2,152	1,049	861	1,441	1,104	1,360	0	0	0	0	827	39	4,410	17,473
Utah	361	2,251	31	0	0	17	189	0	0	0	139	74	0	0	0	34	1,464	4,526
Nevada	67	725	0	0	0	55	40	0	0	0	0	0	0	0	0	9	160	1,067
Total	6,690	4,195	2,488	2,400	2,152	1,836	1,775	1,496	1,495	1,438	1,196	1,124	1,020	977	827	139	16,567	47,876
Pacific																		
	10-10-10	10-10-5	17-7-0	6-10-4	8-8-4	8-10-12	15-8-4	10-16-8	4-4-2	16-10-0	11-8-4	6-20-20	4-10-10	10-10-0	6-9-6			
Washington	830	157	0	3,026	0	0	0	231	0	0	0	1,642	0	19	0	77	30,049	35,954
Oregon	837	121	0	4,109	0	5	8	5,555	0	0	0	2,937	0	0	0	58	12,958	26,450
California	20,537	19,460	15,903	7,305	14,214	8,438	7,807	0	5,015	4,992	4,891	0	4,379	4,345	4,086	3/ 2	125,122	246,494
Total	22,204	19,738	15,903	14,440	14,214	8,443	7,815	5,786	5,015	4,992	4,891	4,499	4,379	4,364	4,086	108	168,129	308,898
Territories 4/																		
	14-4-10	15-4-7	14-2-8	10-10-8	6-8-10	8-6-10	12-6-10	12-4-10	12-3-16	13-3-12	9-10-5	12-2-10	12-10-5	16-4-5	10-6-14			
Puerto Rico	33,685	16,577	15,775	14,868	12,365	10,626	9,736	8,951	7,698	7,123	4,322	3,891	3,700	3,686	3,371	25	24,775	181,109
Continental United States																		
	5-10-10	3-12-12	4-12-12	5-20-20	5-10-5	10-10-10	4-16-16	12-12-12	3-9-9	4-10-7	2-12-12	4-10-6	3-9-6	6-12-12	0-20-20			
New England	52,710	653	0	0	4,972	29,628	0	2,000	0	0	54	0	0	1,999	15,534	100	240,020	347,570
Middle Atlantic	700,705	27,689	25,399	344	189,079	151,438	844	4,809	100	0	30,999	0	15	27,916	59,308	177	521,239	1,739,884
South Atlantic	372,649	87,433	583,751	647	140,869	34,808	56	5,121	476,763	48,742	365,286	368,779	292,050	12,384	3,271	913	2,044,946	4,839,495
East North Central	116,225	889,608	614	502,873	10,362	325,216	567,959	262,254	239	0	6	0	0	37,916	146,283	182	580,294	3,379,849
West North Central	1,181	68,963	146	175,463	6,928	60,710	39,270	180,952	0	0	0	0	0	14,090	50,569	264	583,515	1,181,797
East South Central	38,553	68,982	127,173	7,759	107,079	27,599	7,464	11,076	1,039	420,801	4,466	0	75,452	238,477	21,853	144	822,928	1,980,701
West South Central	11,247	28,136	132	12,040	218,103	5,651	3	34,621	12	0	0	0	0	1,770	10,728	150	380,646	703,089
Mountain	5	0	0	0	590	1,836	0	6	0	0	0	0	0	219	149	149	45,220	47,876
Pacific	1,627	15	0	385	101	22,204	0	0	10	0	0	18	0	103	510	114	281,925	308,898
Total	1,296,912	1,171,479	737,215	699,511	678,083	659,090	615,596	500,839	478,163	469,543	400,811	368,797	367,517	334,595	310,275	1,387	5,440,733	14,529,159

1/ Exclusive of mixtures not reported by grade. 2/ Including the tonnage of mixtures not reported by grade. 3/ Total number of mixtures ranges over 500 but only 15 reported by grade. 4/ Total consumption in Hawaii was 65,385 tons of mixed fertilizers, comprising 130 grades, which were manufactured to consumer's specifications. Data for Alaska not available. Estimated less than 500 tons.

TABLE 4. Fertilizer Materials Consumed for Direct Application, by States, year ended June 30, 1956, in tons[1]

State and Region	Chemical nitrogen materials								Natural organics[2]	Phosphate materials[3]			Potash materials		Total primary nutrient materials	Secondary and trace nutrient materials[4]
	Ammonia (anhydrous)	Ammonium nitrate	Ammonium nitrate-limestone mixtures	Ammonium sulfate	Calcium cyanamide	Nitrogen solutions and aqua ammonia[5]	Sodium nitrate	Urea	Other[2]		Phosphate rock[6]	Superphosphates: Grades 22 percent and under	Superphosphates: Grades over 22 percent	Other	Chlorides 50-60 percent grades	Other[2]		
Maine	0	1,036	38	78	207	50	122	147	5	708	4	2,635	2	228	44	14	5,338	14
New Hampshire	0	590	11	2	79	1	76	23	2	693	2	2,520	0	72	87	31	4,149	2
Vermont	0	457	48	3	12	0	62	153	2	145	98	16,827	5	31	264	12	15,119	24
Massachusetts	0	1,012	34	146	273	0	741	130	46	8,811	202	3,053	0	635	496	97	15,576	90
Rhode Island	0	103	4	0	267	0	56	14	5	929	6	278	0	54	59	2	1,777	8
Connecticut	1	118	36	22	246	4	69	108	22	12,089	54	6,087	73	1,435	761	861	22,313	176
New England	1	3,316	171	251	1,084	55	1,751	575	82	23,335	366	31,400	80	2,455	1,711	1,017	64,172	315
New York	241	11,653	611	312	3,436	676	4,043	778	235	18,347	919	36,396	400	1,070	758	740	80,577	731
New Jersey	261	1,897	457	75	1,584	490	2,104	546	252	7,778	647	4,102	18	1,968	578	172	22,342	196
Pennsylvania	577	5,338	958	2,143	1,735	1,446	1,592	896	265	9,375	4,552	32,434	240	1,994	807	496	64,306	2,418
Delaware	194	1,183	29	1	614	587	155	82	0	541	170	454	140	72	436	0	4,558	68
District of Columbia	0	0	0	0	2	0	22	20	0	652	0	7	0	57	0	0	706	0
Maryland	406	1,191	591	67	1,450	918	1,482	449	12	1,607	1,643	3,520	7	524	410	1,176	15,439	310
West Virginia	0	855	287	274	10	81	1,686	78	0	378	132	5,794	290	91	80	0	9,986	8
Middle Atlantic	1,679	22,124	2,933	2,872	8,831	4,198	11,084	2,849	764	38,630	8,063	86,767	1,095	5,776	3,069	2,584	199,140	3,731
Virginia	859	3,242	22,936	1,238	1,906	4,073	21,828	383	1	951	1,333	7,014	166	1,368	2,870	16,493	89,821	16,480
North Carolina	6,454	12,658	126,206	218	6,137	12,980	109,298	1,362	0	3,914	1,442	14,577	67	6,181	10,177	10,513	304,828	45,436
South Carolina	826	16,963	82,272	420	1,206	5,711	87,514	495	0	680	976	13,017	0	5,912	17,841	9,075	244,306	3,979
Georgia	7,982	46,300	47,088	2,431	1,978	1,944	79,734	269	141	2,124	287	39,059	186	7,471	6,822	2,849	246,265	25,677
Florida	1,087	13,257	5,744	2,524	2,504	2,728	22,505	2,812	11,556	11,003	28,465	8,731	211	5,721	2,519	17,744	138,572	4,242
South Atlantic	16,738	92,420	284,248	6,831	13,731	27,436	320,900	5,321	11,698	18,672	32,463	80,418	630	26,879	40,229	56,694	1,017,128	96,514
Ohio	2,241	12,699	350	8,731	1,110	2,418	852	1,676	52	7,151	6,081	12,613	2,332	2,167	1,249	857	64,523	165
Indiana	11,002	15,665	150	3,060	904	6,306	232	6,591	20	3,057	15,677	9,804	11,364	2,528	19,254	510	142,758	228
Illinois	18,570	43,969	1,260	27,411	794	9,672	13	5,850	21	12,040	570,274	40,569	27,114	10,197	76,301	60	844,775	746
Michigan	1,767	9,737	57	5,181	181	2,164	340	2,253	66	12,640	1,998	8,845	1,009	906	1,501	693	48,274	991
Wisconsin	1,245	5,836	0	249	62	1,071	0	238	2	4,078	4,860	1,297	522	717	6,470	926	18,220	91
East North Central	35,305	102,306	1,985	45,032	3,231	23,631	1,437	16,908	141	40,966	598,910	69,544	42,701	16,715	109,772	2,745	1,118,750	2,245
Minnesota	13,694	4,811	0	449	83	5,506	0	526	15	4,084	1,062	4,376	25,834	10,238	3,718	211	76,611	2,154
Iowa	10,523	27,322	0	444	45	6,753	0	1,840	1	4,167	9,161	31,159	20,507	20,061	9,075	99	143,151	118
Missouri	15,538	57,181	0	848	40	4,389	18	740	5	3,701	236,112	3,422	6,157	7,470	19,297	363	355,627	14
North Dakota	102	347	0	20	0	84	0	42	0	94	40	30	17,598	26,380	22	0	45,309	1
South Dakota	1,618	2,455	0	7	0	1,179	0	334	0	330	130	571	4,918	6,436	31	0	17,179	0
Nebraska	36,153	50,013	173	312	0	11,789	0	2,667	0	772	266	2,490	17,994	9,501	264	0	112,415	64
Kansas	8,240	18,496	0	617	1	636	4	359	2	852	1,213	5,159	34,376	37,626	1,710	0	149,927	11
West North Central	85,868	184,759	173	2,797	171	30,436	22	6,507	45	14,007	248,002	49,511	127,574	117,532	34,117	673	900,132	2,364
Kentucky	1,641	29,387	111	455	1,459	474	1,467	102	7	530	15,391	24,119	2,516	9,328	9,303	6,395	102,762	119
Tennessee	12,013	25,764	480	896	1,080	0	16,254	33	4	1,359	1,735	10,505	4,967	7,758	11,563	1,253	105,702	229
Alabama	2,957	79,130	35,178	2,074	737	734	65,655	179	3	523	3,249	21,415	373	50,022	9,473	49	291,731	1,540
Mississippi	43,068	139,400	7,723	1,749	11,624	638	52,402	868	0	64	4,586	32,750	2,315	34,470	22,300	845	417,734	12
East South Central	61,677	283,681	43,492	5,200	14,900	1,846	135,778	1,182	14	2,476	29,961	88,856	10,171	101,578	52,629	8,542	917,929	1,900
Arkansas	21,038	61,607	38	4,121	10,741	727	21,939	6,452	1	56	671	7,977	9,645	4,213	30,603	354	188,087	1
Louisiana	25,910	35,901	529	9,304	2,015	2,819	24,110	1,283	216	231	6,295	16,027	2,960	5,961	6,043	738	139,806	55
Oklahoma	1,621	5,693	60	371	0	0	354	278		1,339	3,522	28,130	6,620	9,195	889	86	58,781	11
Texas	41,293	82,288	0	41,055	2,737	6,326	8,855	2,436	106	1,581	5,410	42,554	27,796	68,191	971	0	306,211	2,488
West South Central	90,256	187,509	627	55,431	15,553	10,872	55,258	12,449	323	9,127	15,798	99,358	47,181	91,640	40,506	1,259	993,167	3,553
Montana	1,088	2,910	0	2,699	0	100	0	221	0	196	0	90	16,078	4,636	62	0	28,042	1,189
Idaho	4,432	6,349	0	9,691	139	3,516	30	485	95	209	0	3,002	16,145	7,949	129	0	52,431	6,204
Wyoming	0	142	0	402	0	14	0	302	0	1	0	25	5,285	1,401	27	0	8,479	691
Colorado	2,614	10,180	197	1,691	12	785	0	1,184	0	1,426	0	791	13,826	5,481	430	294	41,323	186
New Mexico	4,520	1,174	0	852	0	0	0	1,674	40	1,117	0	5,611	8,048	4,049	64	0	27,159	0
Arizona	14,407	8,061	0	21,174	819	10,997	774	10,604	9,541	9,979	0	5,171	3,195	29,419	182	1,054	125,504	10,563
Utah	1,821	6,138	0	5,781	0	20	0	954	5	968	0	1,944	5,569	3,379	50	0	26,201	237
Nevada	11	49	0	618	0	116	0	87	0	231	0	40	697	733	0	0	2,438	1,077
Mountain	28,893	35,003	197	46,958	970	15,548	834	15,511	9,682	13,967	0	16,679	68,644	56,187	904	1,349	311,777	20,147
Washington	19,013	22,013	0	10,373	643	28,753	97	1,372	2,176	4,658	416	5,868	7,565	14,132	2,485	299	121,470	12,415
Oregon	5,353	22,562	0	18,666	937	12,407	0	2,631	1,548	761	37	10,573	843	26,311	2,730	193	137,532	15,961
California	68,412	58,179	0	149,234	6,238	216,857	185	18,104	15,811	306,862	1,750	64,015	17,569	101,446	1,836	5,295	1,038,513	628,696
Pacific	92,778	102,754	0	178,273	7,818	258,017	282	22,107	19,535	312,281	2,203	80,456	25,977	141,889	7,151	5,777	1,297,515	657,072
Continental U. S.	416,453	940,503	333,908	359,407	65,618	365,617	540,962	83,835	24,602	472,657	909,026	601,593	524,059	610,671	307,781	80,650	6,478,944	786,605
Hawaii		41	0	11,378	0	50,834	233	6,235	66	49	2,888	3,999	1,599	2,762	14,604	1,675	87,743	2,996
Puerto Rico	2,001	0	0	4,274	0	1,912	9	302	0	0	0	1,434	65	1,219	106	103	31,725	0
Alaska[7]	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Territories	2,001	41	0	34,371	0	53,006	242	8,538	66	49	2,888	5,433	1,664	3,981	14,710	1,778	149,468	2,996
Total: 1955-56	418,454	940,666	333,908	414,198	65,618	418,643	541,204	90,373	24,668	472,706	910,914	607,026	525,723	614,652	322,411	82,428	6,907,812	789,601
1954-55	353,684	1,115,138	198,063	519,958	68,882	340,574	615,842	68,985	59,254	461,100	604,653	685,722	341,940	592,340	318,657	82,427	6,587,006	791,606
1953-54	350,474	984,736	190,601	536,716	68,213	194,592	653,105	(8/)	144,964	420,068	912,676	786,927	247,142	598,141	309,735	81,818	6,616,910	615,513

1/ Includes fertilizers distributed by Government agencies. Excludes lime and the quantities of materials used for manufacture of commercial mixtures. 2/ The principal fertilizers are shown separately in Table 5, by regions. 3/ Includes colloidal phosphate the quantity of which is shown separately in Table 5, by regions. 4/ Includes an estimated 245,000 tons of dried manures. 5/ Not available, estimated less than 1,000 tons. 6/ Revised - 8,541 tons of basic slag was deleted from the Pennsylvania total. 7/ Revised - 11,298 tons of calcium sulfate (gypsum) was added to the North Carolina total. 8/ Withheld to avoid disclosing figures for individual establishments.

fertilizers in 1955–56 was for nitrogen, 5.39 per cent; for available P_2O_5, 12.08 per cent; for K_2O, 11.20 per cent; and for the total of these nutrients 28.67 per cent. The corresponding values in the preceding year were 5.24, 11.86, 10.80, and 27.90 per cent. The proportionate increase was highest for K_2O and lowest for P_2O_5.

MATERIALS

In 1955–56 the consumption of fertilizer materials for direct application amounted to 7,417,417 tons as compared with 7,378,612 tons in 1954–55 (Table 1). Fertilizer materials in 1955–56 comprised chemical nitrogen materials, 3,271,952 tons; natural organic materials, 472,706 tons; phosphate materials (including ammonium phosphates, ammonium phosphate-sulfate, and ammonium phosphate-nitrate), 2,478,315 tons; potash materials (including potassium nitrate, potassium-sodium nitrate, and limepotash), 404,839 tons; and secondary and trace nutrient materials, 789,605 tons. Compared with the previous year, there was an increase of 11,606 tons in natural organic materials, 253,660 tons in phosphate materials, and 3,755 tons in potash materials. Chemical nitrogen materials and secondary and trace nutrient materials decreased 228,215 tons and 2,001 tons, respectively. The consumption of the principal materials comprising these classes is shown by states and regions in Tables 4 and 5.

Compared with the previous year, the principal changes in consumption of the chemical nitrogen materials in 1955–56 were increases in the tonnages of urea (35 per cent), aqua ammonia (34 per cent), and anhydrous ammonia (18 per cent). The largest increases in the tonnages of urea were in the East North Central, West South Central, Mountain, and Pacific regions, which together accounted for 73 per cent of the consumption of this material in 1955–56. Most of the increase in consumption of aqua ammonia was in the Pacific region where 77 per cent of the total tonnage was used. Increases in the consumption of anhydrous ammonia were mostly in the South Central and Pacific regions—53,123 tons, 27.5 per cent.

Decreases in the consumption of chemical nitrogen materials comprised chiefly sodium nitrate (73,038 tons, 12 per cent), ammonium nitrate-limestone mixtures (44,095 tons, 12 per cent), ammonium nitrate (174,692 tons, 16 per cent), and ammonium sulfate (105,570 tons, 20 per cent).

Phosphate rock was the only phosphate material that showed a large increase in consumption (330,812 tons, 57 per cent), nearly all of which was in Illinois and Missouri, the states using more than 85 per cent of the total tonnage of this material in 1955–56. The other increases in phosphate materials were chiefly in basic slag (20,882 tons) and the total for all kinds of ammonium phosphate products (23,011 tons). Decreases in the consumption of superphosphates containing 22 per cent or less of available P_2O_5 occurred in all the regions and totaled 78,696 tons (11 per cent). The decrease of 16,217 tons (5 per cent) in the consumption of superphosphates containing more than 22 per cent P_2O_5 was spread over 5 of the 10 regions. No consumption of fused tricalcium phosphate was reported for 1955–56; manufacture of this material by the Tennessee Valley Authority, the only producer, ceased in the year ended June 30, 1954.

The consumption of potash materials for direct application increased only 0.9 per cent (from 401,084 tons to 404,839 tons). Among the individual materials, the use of the 58–62 per cent grades of potassium chloride, which comprised 76 per cent of the total consumption of potash materials, showed the largest increase in quantity (27,821 tons, 10 per cent).

As in previous years, calcium sulfate accounted for most of the tonnage of secondary and trace nutrient materials; the proportion was 94 per cent (738,499 tons) in 1955–56.

The weighted average primary nutri-

TABLE 5. Kinds of Fertilizers Consumed in Regions of the United States, year ended June 30, 1956, in tons[1]

Kind	New England	Middle Atlantic	South Atlantic	East North Central	West North Central	East South Central	West South Central	Mountain	Pacific	Territories 2/	Total
MIXTURES: N-P-K	322,845	1,639,449	4,434,561	3,120,385	960,485	1,823,795	635,688	23,462	248,214	208,360	13,417,244
N-P	81	281	2,323	24,458	135,278	1,761	40,769	24,094	55,039	5,217	289,337
P-K	24,644	99,982	216,067	234,361	86,006	153,070	25,828	272	2,402	3,187	845,419
N-K	0	172	186,544	9	28	2,075	804	48	1,283	29,730	220,653
CHEMICAL NITROGEN MATERIALS											
Ammonia, anhydrous	3	1,679	16,788	36,926	85,868	61,677	91,758	28,976	90,778	2,001	3/418,454
Ammonia, aqua: 20-26% N	0	21	200	2,870	1,140	0	2,819	9,865	239,827	53,206	3/ 309,948
Ammonium nitrate	3,916	22,124	96,420	109,926	163,755	281,681	127,509	36,514	98,780	41	940,666
Ammonium nitrate-limestone mixtures	171	2,935	264,448	1,885	173	43,492	627	197	0	0	313,928
Ammonium sulfate	251	2,892	6,841	45,022	2,797	5,206	57,493	46,952	191,972	54,971	414,398
Calcium cyanamide	1,204	8,871	13,639	3,231	171	14,860	15,554	970	7,318	0	65,818
Calcium nitrate	0	5	10,482	0	0	0	386	9,637	34,969	66	55,585
Nitrogen solutions: 20-41% N	55	4,117	27,158	16,761	27,802	1,796	7,253	5,703	18,250	0	2/ 108,875
Sodium nitrate	1,751	11,084	320,900	1,423	22	156,198	50,168	734	282	242	542,804
Urea	575	2,849	5,321	15,904	6,677	1,242	13,219	15,321	22,707	8,518	92,373
Other	82	752	1,206	131	43	14	230	45	6,561	0	6/ 9,063
NATURAL ORGANIC MATERIALS											
Blood, dried	20	173	44	0	0	1	0	19	2,547	0	2,804
Castor pomace	2,456	95	1,688	0	0	0	0	0	937	0	5,176
Compost 7/	0	136	3	4,979	585	95	2,579	200	0	0	8,577
Cottonseed meal 7/	7,141	44	2,207	0	0	16	0	0	1	0	9,411
Fish scrap, meal, emulsions	505	0	26	0	0	0	0	1,685	0	0	2,216
Manures, dried	4,379	16,972	2,774	6,107	2,206	1,067	3,122	1,480	247,559	9	285,675
Sewage sludge, activated	5,472	12,865	7,160	29,027	11,108	1,277	3,426	10,689	20,102	40	101,166
Sewage sludge, other	0	0	0	556	103	0	209	34,983	0	0	35,851
Tankage, animal	0	223	196	0	0	0	0	0	1,326	0	1,745
Tankage, process	2,774	8,182	3,598	297	5	4	0	490	300	0	15,650
Other	586	0	976	0	0	16	0	0	2,857	0	8/ 4,435
PHOSPHATE MATERIALS											
Ammonium phosphate: 11-48%	0	7	0	3,747	20,974	0	2,241	3,351	14,399	2,409	47,128
" " 11-50%	0	0	0	0	1,113	0	50	483	0	0	1,646
" " 13-39%	0	0	0	498	16,967	0	13,649	5,006	6,411	0	42,127
Ammonium phosphate sulfate: 16-20%	0	0	0	402	58,666	210	56,130	36,402	99,503	233	251,546
Ammonium phosphate nitrate: 27-14%	0	0	0	0	606	0	0	(10)	5,246	0	5,852
Ammoniated superphosphate 11/	0	0	264	0	0	0	44	0	5,672	1,219	7,199
Basic lime phosphate	0	0	693	0	0	5	0	0	0	0	698
Basic slag	0	48	21,974	0	146,943	3,300	0	0	0	0	20/ 171,865
Bonemeal, raw	32	359	289	336	178	22	396	40	1,016	0	2,668
Bonemeal, steamed	1,472	4,972	178	1,463	21	297	184	0	1,454	0	10,741
Calcium metaphosphate	0	299	2,398	9,058	15,426	13,207	2,550	188	0	0	43,126
Diammonium phosphate: 21-53%	150	91	203	1,215	3,946	1,294	2,428	4,127	280	120	13,854
Phosphoric acid: 36-54% P_2O_5	0	0	0	0	35	0	708	6,530	7,948	0	12/ 15,221
Phosphate rock	366	8,023	27,863	595,671	245,504	16,510	15,297	0	1,787	2,888	91,909
Colloidal phosphate	0	40	600	3,239	2,758	8,451	1,501	0	416	0	17,005
Precipitated bone	801	0	0	0	0	0	0	0	0	0	801
Superphosphate: 18%	3,743	11,662	22,348	23,379	17,604	19,139	518	832	0	0	99,225
" 19%	180	24	1,823	0	97	22	0	6,707	72,897	0	81,750
" 20-22%	27,477	71,081	58,247	46,469	31,810	69,695	99,558	9,454	6,927	9,833	426,051
" 23-41%	0	8	0	1,644	291	0	4,636	1,159	0	0	7,738
" 42-44%	0	0	0	0	26,170	0	35	35,296	10,365	0	71,866
" 45%	73	737	39	31,123	66,296	1,565	38,117	16,706	1,829	19	156,464
" 46%	0	251	9	7,481	25,190	4,371	1,864	15,483	13,666	1,645	69,962
" 47%	0	90	88	1,132	3,680	294	326	0	0	0	5,610
" 48%	7	9	449	901	5,430	2,787	1,016	0	117	0	10,716
" 49-50%	0	0	45	420	561	1,152	1,189	0	0	0	3,367
Other	0	0	180	0	0	0	0	0	0	0	13/ 180
POTASH MATERIALS											
Cotton bull ashes	632	2	311	0	0	0	0	0	0	0	945
Lime-potash mixtures 14/	0	1,091	22,359	0	0	0	0	0	0	0	15/ 23,452
Manure salts: 20-30% K_2O	0	10	717	25	0	0	220	0	0	0	972
Potassium chloride: 48-52% K_2O	2	204	5,508	1,328	1,170	1,321	2,432	120	1,186	0	13,181
" " 58-62% K_2O	1,709	2,845	39,721	125,447	12,967	51,918	38,074	914	5,925	14,710	309,230
" magnesium sulfate	116	598	2,109	1,620	466	1,469	101	0	208	1	6,688
" sodium nitrate 14/	90	1	19,700	8	0	32	849	0	0	0	20,680
" sulfate	179	874	7,187	1,098	207	7,021	99	1,348	5,493	1,777	25,297
Other	0	6	4,311	1	0	0	0	0	76	0	16/ 4,394
PRIMARY NUTRIENT FERTILIZERS	415,942	1,939,264	5,856,891	4,512,599	2,061,947	2,898,690	1,366,256	359,599	1,596,313	395,962	21,403,465
SECONDARY & TRACE NUTRIENT MATERIALS											
Aluminum sulfate 7/	8	10	2	0	0	0	0	0	86	0	106
Borax 7/	63	248	746	164	42	384	22	0	388	0	2,057
Calcium sulfate (gypsum)	143	2,886	92,593	1,058	2,260	1,288	24	16,927	621,360	0	20/ 738,499
Copper sulfate 7/	0	38	382	55	13	0	0	5	133	0	626
Ferrous sulfate 7/	0	0	42	0	0	0	0	34	17/ 8,849	2,842	8,077
Magnesium sulfate 7/	89	316	1,983	20	5	0	0	109	22	0	2,544
Manganese sulfate 7/	0	143	259	18/ 901	2	0	30	1	52	0	388
Mixed minerals 7/	2	0	4	8	0	5	3	302	3,650	0	3,974
Sulfur: 25-99% S	10	70	402	38	49	1	2,034	2,536	20,001	0	25,141
Sulfuric acid: 40-93%	0	0	0	0	0	4	434	18	4,456	0	4,904
Zinc sulfate 7/	0	24	141	1	5	22	8	4	19/ 1,988	92	2,285
SECONDARY & TRACE NUTRIENT MATERIALS	315	3,733	96,514	2,245	2,378	1,700	2,555	20,137	657,072	2,956	789,605
ALL FERTILIZERS	416,257	1,942,997	5,953,407	4,514,844	2,064,325	2,900,390	1,368,811	379,736	2,253,385	398,918	22,193,070

1/ Includes distribution by Government agencies. Does not include the quantities of materials used for the manufacture of the indicated quantities of commercial mixtures. 2/ Hawaii and Puerto Rico. 3/ 343,576 tons N. 4/ 62,510 tons N. 5/ 34,493 tons N. 6/ 1,769 tons N. 7/ Distributed by manufacturers of fertilizers. 8/ Average 4.07-2.14-0.66. 9/ Includes quantities reported as mixtures. 10/ All quantities totaling 1,775 tons were, by error, left in mixtures. Their State totals are listed in Table 5. 11/ Additional quantities may have been reported as mixtures. 12/ 7,515 tons P_2O_5. 13/ 29 tons available P_2O_5. 14/ Additional quantities are given free to farmers for which no records are kept. 15/ 1,418 tons K_2O. 16/ Average 0.55-1.21-6.78. 17/ Includes 1,239 tons of ferrous oxide. 18/ Includes 71 tons of manganese oxide. 19/ Includes 109 tons of zinc oxide. 20/ Revised total for year ended June 30, 1955: basic slag, 150,983 tons; calcium sulfate, 752,414 tons.

TABLE 6. Consumption of Primary Plant Nutrients, year ended June 30, 1956, in tons[1]

State and Region	Mixtures 2/ N	Mixtures 2/ Available P_2O_5	Mixtures 2/ K_2O	Mixtures 2/ Average nutrient content	Materials: Single nutrient 3/ N	Materials: Single nutrient 3/ Available P_2O_5 4/	Materials: Single nutrient 3/ K_2O	Materials: Multiple nutrients 5/	Materials: Average nutrient content	Average nutrient content of mixtures and materials
Maine	7.65	11.50	12.42	31.57	29.80	20.26	55.77	20.14	23.75	31.35
New Hampshire	6.32	12.76	13.52	32.60	27.59	20.02	55.08	11.28	21.40	29.75
Vermont	3.90	15.74	16.86	36.50	32.80	21.04	59.42	11.46	22.04	31.33
Massachusetts	6.54	9.84	9.69	26.07	18.27	19.11	58.80	10.95	16.30	24.01
Rhode Island	5.62	10.27	10.49	26.38	19.40	19.37	59.02	9.95	16.49	25.20
Connecticut	6.18	9.38	10.25	25.81	22.97	23.72	56.92	12.69	18.90	24.71
New England	6.77	11.29	12.01	30.07	23.03	21.28	57.68	12.26	19.60	28.35
New York	6.24	11.74	9.84	27.82	25.76	20.22	54.11	9.71	20.69	26.82
New Jersey	5.59	10.68	10.52	26.79	24.45	18.04	52.80	13.13	20.02	26.19
Pennsylvania	5.21	12.01	11.51	28.73	28.76	18.87	47.92	11.95	20.86	27.94
Delaware	5.06	11.65	12.28	28.99	33.41	23.03	60.78	9.37	31.77	29.14
District of Columbia	7.04	9.41	5.30	21.75	19.66	20.39	0	11.99	13.18	19.16
Maryland	4.63	11.17	10.22	26.02	28.32	16.61	21.58	12.37	21.99	25.80
West Virginia	4.22	12.16	10.32	26.70	22.38	21.30	61.25	10.78	21.52	26.09
Middle Atlantic	5.42	11.61	10.68	27.71	26.76	19.45	43.99	11.25	21.04	27.01
Virginia	3.84	11.08	10.73	25.65	21.47	22.60	14.59	19.58	20.07	25.01
North Carolina	4.02	9.39	9.08	22.49	21.42	16.14	39.03	14.74	22.07	22.42
South Carolina	3.56	10.10	9.61	23.27	20.35	15.07	56.62	28.32	23.27	23.27
Georgia	4.23	10.31	10.35	24.89	24.44	18.56	57.09	18.72	24.31	24.77
Florida	5.73	6.80	8.39	20.92	22.60	8.07	50.71	17.61	18.49	20.68
South Atlantic	4.40	9.26	9.47	23.13	21.99	15.11	40.30	19.10	22.26	22.98
Ohio	4.78	13.64	13.44	31.86	33.61	20.15	54.75	13.26	27.80	31.60
Indiana	5.41	15.70	15.66	36.77	41.96	21.27	61.09	29.97	42.05	37.48
Illinois	5.91	14.67	15.01	35.59	38.35	6.53	60.93	17.42	15.71	23.24
Michigan	5.46	15.19	15.23	35.88	35.28	18.99	50.41	10.38	25.06	35.05
Wisconsin	3.98	16.15	18.96	39.09	49.39	14.56	58.04	11.81	35.13	38.78
East North Central	5.15	14.91	15.21	35.27	38.97	7.92	60.45	15.46	20.67	31.60
Minnesota	5.16	21.60	15.86	42.62	59.62	43.11	59.74	37.26	48.90	43.94
Iowa	6.61	18.63	12.85	38.09	45.35	29.27	59.97	35.17	37.25	37.82
Missouri	8.08	14.39	11.91	34.38	43.27	5.48	59.81	24.84	17.20	26.85
North Dakota	8.75	28.10	6.00	42.85	38.55	45.75	60.46	51.95	49.12	46.96
South Dakota	10.67	24.85	1.82	37.34	51.49	39.77	60.37	42.95	44.31	41.84
Nebraska	10.18	21.10	3.75	35.03	56.10	42.23	61.74	44.15	52.45	49.76
Kansas	10.08	21.46	5.44	36.98	41.88	40.17	60.46	41.09	41.34	39.70
West North Central	7.19	18.20	12.35	37.74	48.64	19.26	59.90	41.73	33.46	35.91
Kentucky	4.66	11.73	11.54	27.93	34.70	23.10	55.12	38.83	32.13	28.73
Tennessee	5.01	11.80	11.09	27.90	37.64	25.41	59.26	20.06	37.13	29.79
Alabama	3.93	10.75	8.43	23.11	24.66	12.25	60.35	34.88	22.69	23.00
Mississippi	5.73	9.68	8.18	23.59	37.47	12.16	58.79	45.73	30.59	27.49
East South Central	4.62	11.00	9.62	25.24	32.66	15.30	58.19	31.07	29.00	26.43
Arkansas	6.19	12.88	12.91	31.98	38.04	36.54	60.08	36.62	41.71	37.02
Louisiana	6.48	13.03	10.23	29.74	40.00	17.57	57.98	32.65	36.01	32.63
Oklahoma	7.42	16.43	6.75	30.60	40.61	23.23	59.78	40.91	29.67	30.19
Texas	7.67	14.84	7.37	29.88	45.13	28.07	57.91	38.07	38.33	34.02
West South Central	7.00	14.10	9.15	30.45	41.04	26.25	59.71	38.17	38.03	34.13
Montana	9.98	21.14	.96	32.08	36.58	43.31	60.40	43.76	41.73	40.60
Idaho	14.05	16.11	2.66	32.82	35.70	40.47	60.89	39.74	38.12	37.63
Wyoming	10.93	23.06	1.85	35.84	32.77	46.03	60.40	51.86	44.25	42.75
Colorado	11.12	19.13	6.12	36.37	38.81	45.20	57.18	44.05	42.33	40.98
New Mexico	14.64	18.08	2.57	35.29	61.10	35.34	60.40	38.89	43.92	43.38
Arizona	13.95	16.78	3.12	33.85	37.06	35.13	54.45	32.76	35.87	35.62
Utah	10.36	12.75	3.67	26.78	34.43	40.90	60.40	44.83	37.73	36.11
Nevada	7.83	11.18	4.20	23.21	23.93	40.06	0	30.80	29.56	27.47
Mountain	12.38	17.42	3.66	33.46	37.94	40.82	56.16	36.69	38.68	37.98
Washington	7.86	14.64	11.02	33.52	37.90	34.29	58.61	32.90	37.21	36.37
Oregon	8.64	15.62	9.67	33.93	38.71	21.71	60.69	38.17	30.82	31.36
California	10.51	10.50	6.18	27.19	30.20	26.62	54.90	12.75	23.36	24.10
Pacific	10.04	11.42	7.05	28.51	30.95	27.09	57.01	15.11	25.41	26.01
Continental U. S.	5.28	12.18	11.19	28.65	32.69	16.53	55.47	22.60	27.42	28.27
Hawaii	11.86	7.99	16.85	36.70	23.15	20.28	59.59	57.69	29.96	32.66
Puerto Rico	11.77	5.96	10.08	27.81	23.54	21.61	55.50	22.00	23.58	26.87
Alaska 2/	---	---	---	---	---	---	---	---	---	---
Territories	11.79	6.50	11.87	30.16	23.31	20.48	59.54	46.90	27.75	29.25
U. S. Average:										
1955-56	5.39	12.08	11.20	28.67	32.35	6/ 16.55	55.64	22.71	6/ 27.43	28.09
1954-55	5.24	11.86	10.80	27.90	31.00	6/ 19.37	54.56	21.64	6/ 27.80	9/ 27.90
1953-54	5.01	11.54	10.32	26.87	30.81	15.70	54.01	17.53	25.99	26.01

1/ Excluding materials not guaranteed to contain one or more of the primary plant nutrients, N, P_2O_5, or K_2O. 2/ Guaranteed to contain two or more of the primary plant nutrients. 3/ Guaranteed to contain one of the primary plant nutrients. 4/ Including 2 percent of the colloidal phosphate and 3 percent of the phosphate rock marketed for direct application. 5/ Not available. 6/ Revised: See table 6, footnote 6 for basis of revisions.

TABLE 7. Weighted Average Primary Plant Nutrient Content of Fertilizers, in per cent, year ended June 30, 1956[1]

State & Region	Content of mixtures					Content of all fertilizers[2]				
	Nitrogen	P_2O_5 Available	P_2O_5 Total	K_2O	Total N, avail. P_2O_5, and K_2O	Nitrogen	P_2O_5 Available[3]	P_2O_5 Total[4]	K_2O	Total N, avail. P_2O_5, and K_2O
Maine	13,625	20,472	21,591	22,110	56,207	14,209	21,114	22,257	22,152	57,475
New Hampshire	769	1,554	1,686	1,646	3,969	1,045	2,095	2,236	1,717	4,857
Vermont	1,270	5,124	5,279	5,488	11,882	1,523	6,698	8,975	5,654	15,875
Massachusetts	3,829	5,758	6,004	5,670	15,257	4,973	6,741	7,083	6,096	17,812
Rhode Island	737	1,348	1,384	1,376	3,461	892	1,440	1,480	1,422	3,754
Connecticut	1,288	4,989	5,262	5,453	13,730	4,542	7,202	7,592	6,393	18,137
New England	21,518	39,245	41,206	41,743	104,506 *	27,186	47,290	49,623	43,434	117,910
New York	30,730	57,833	61,699	48,487	137,050	38,096	66,122	70,562	49,501	153,739
New Jersey	13,370	25,537	26,351	25,157	64,064	15,888	27,083	28,111	25,686	68,657
Pennsylvania	30,482	70,299	73,017	67,367	168,148	35,554	78,044	82,343	68,088	181,986
Delaware	4,084	9,394	9,768	9,906	23,384	5,085	9,598	10,026	10,181	24,864
District of Columbia	125	167	180	94	386	182	208	223	97	487
Maryland	12,309	29,677	31,531	27,154	69,140	14,332	30,687	33,043	27,915	72,534
West Virginia	3,163	9,106	9,756	7,769	19,998	3,902	10,462	11,213	7,785	22,149
Middle Atlantic	94,263	202,013	212,262	185,894	482,170	113,039	229,204	235,521	189,673	524,116
Virginia	25,861	74,554	79,595	72,173	172,588	28,508	76,895	82,382	75,010	190,413
North Carolina	54,349	128,859	136,917	120,705	303,913	109,598	130,806	142,114	130,678	371,202
South Carolina	21,933	62,144	66,600	59,098	143,175	63,045	65,164	70,055	71,949	200,158
Georgia	42,262	102,972	110,353	103,412	248,646	88,446	111,776	119,635	108,281	308,503
Florida	68,791	81,691	99,508	100,844	251,130	86,186	82,102	102,526	104,528	274,835
South Atlantic	213,196	448,220	496,973	456,232	1,119,652	385,783	469,883	523,762	490,446	1,346,112
Ohio	47,064	134,393	142,491	132,410	313,867	57,672	139,456	149,512	134,705	331,833
Indiana	49,861	144,602	149,381	144,232	338,695	77,358	152,832	162,323	168,539	398,729
Illinois	30,448	75,555	78,979	77,308	183,311	72,784	119,272	289,201	123,934	316,010
Michigan	31,597	87,904	91,360	88,148	207,649	39,584	90,841	95,029	89,321	219,746
Wisconsin	15,127	61,350	63,774	70,007	148,504	20,811	62,874	66,715	76,174	159,859
East North Central	174,097	501,804	525,985	514,105	1,192,026	268,209	565,295	762,800	592,673	1,426,177
Minnesota	14,941	62,491	64,079	45,883	123,317	32,347	80,173	82,313	48,273	160,793
Iowa	20,028	56,968	59,587	39,324	116,500	41,917	81,143	87,095	44,838	169,898
Missouri	36,752	65,459	68,853	54,161	156,372	71,396	80,189	152,182	65,970	217,555
North Dakota	2,087	6,705	7,027	1,432	10,224	6,101	24,935	25,743	1,446	32,482
South Dakota	1,003	2,341	2,490	172	3,518	4,486	6,451	6,754	193	11,130
Nebraska	2,088	4,327	4,380	770	7,185	49,072	16,139	16,582	939	66,150
Kansas	7,866	16,757	17,304	4,248	28,871	33,688	43,478	44,980	5,302	82,468
West North Central	84,767	215,050	223,660	145,970	445,987	241,007	332,508	415,609	166,961	740,476
Kentucky	20,130	50,691	54,943	49,868	120,689	32,450	62,726	71,807	50,527	153,703
Tennessee	20,553	48,416	50,135	43,484	114,453	45,724	54,886	59,403	51,009	151,699
Alabama	31,678	86,644	92,876	67,906	186,248	82,748	96,036	103,930	73,664	252,448
Mississippi	19,054	38,175	36,629	27,202	78,431	126,497	48,578	51,723	41,162	206,237
East South Central	91,415	217,926	234,583	190,480	499,821	277,419	262,226	286,883	216,442	766,087
Arkansas	10,849	22,969	23,850	22,622	56,040	61,555	30,548	32,234	42,377	134,500
Louisiana	10,503	21,309	22,585	16,722	48,634	51,784	26,308	30,045	20,319	99,011
Oklahoma	5,675	12,576	13,146	5,163	23,414	10,764	24,420	26,354	5,722	40,906
Texas	22,066	42,702	44,718	21,219	85,987	87,711	82,207	86,994	21,927	191,855
West South Central	49,191	99,190	104,299	65,726	214,075	211,814	164,083	175,627	90,375	466,272
Montana	373	789	811	39	1,198	3,523	9,304	9,446	74	12,901
Idaho	736	967	1,010	143	1,766	11,061	10,602	11,002	223	21,906
Wyoming	201	424	447	34	659	947	3,414	3,486	50	4,411
Colorado	1,339	2,303	2,430	737	4,379	9,375	11,329	11,989	1,166	21,870
New Mexico	268	331	348	47	646	6,063	6,419	6,611	93	12,575
Arizona	2,437	2,933	3,057	545	5,915	35,997	13,677	14,037	1,266	50,940
Utah	469	577	644	166	1,212	6,017	4,901	5,127	186	11,104
Nevada	82	117	125	44	243	404	425	444	66	875
Mountain	5,905	8,341	8,892	1,752	16,018	73,407	60,071	61,742	3,104	136,582
Washington	2,825	5,264	5,455	3,961	12,050	37,998	13,612	14,055	5,640	57,250
Oregon	2,286	4,133	4,402	2,559	8,978	31,131	12,811	13,309	4,345	48,287
California	25,916	85,894	26,732	15,247	67,059	208,178	77,909	80,676	23,345	309,432
Pacific	31,027	35,291	36,589	21,767	88,087	277,307	104,332	108,040	33,330	415,169
Continental U. S.	767,605	1,769,048	1,880,409	1,605,669	4,162,342	1,875,371	2,227,892	2,621,607	1,835,638	5,938,901
Hawaii	7,752	5,222	5,222	11,016	23,990	24,156	8,206	9,128	20,717	53,279
Puerto Rico	21,316	10,803	12,159	18,247	50,366	32,876	11,302	12,663	18,363	62,561
Alaska[5]	---	---	---	---	---	---	---	---	---	---
Territories	29,068	16,025	17,381	29,263	74,356	57,032	19,528	21,811	39,080	115,840
Total: 1955-56	796,673	1,785,073	1,897,790	1,634,932	4,236,698	1,932,403	[2]2,247,420	2,643,418	1,874,718	6,054,741
1954-55	803,541	1,821,087	1,941,822	1,657,864	4,282,492	1,960,516	[2]2,283,660	[3]2,596,719	1,874,943	6,119,139
1953-54	778,099	1,793,871	1,922,708	1,603,584	4,175,554	1,847,416	2,234,548	2,619,419	1,813,594	5,895,558

1/ Includes Government distribution. 2/ Total in mixtures and direct application materials. 3/ Including 2 percent of the colloidal phosphate and 3 percent of the phosphate rock marketed for direct application. 4/ Including 22 percent of the colloidal phosphate and 32 percent of the phosphate rock marketed for direct application. 5/ Data not available - estimated total plant nutrients in all fertilizers amounted to 700 tons. [6]/ Revised by deletion of 702 tons of available P_2O_5 from the Pennsylvania total. [7]/ Revised by deletion of 830 tons of total P_2O_5 from the Pennsylvania total.

ent content of the various classes of materials consumed is given in Table 7. These averages are based on the composition and tonnage of the individual materials comprising the respective classes. In 1955–56 for materials containing only nitrogen, P_2O_5, or K_2O, the respective national averages were 32.35, 16.55 (available P_2O_5), and 55.64 per cent, while the multiple-nutrient materials averaged 22.71 per cent. The corresponding averages for these classes in 1954–55 were 31.00, 19.37 (revised), 54.56, and 21.64 per cent. That the national averages for most of the classes were higher in 1955–56 than in the preceding year reflects generally the greater use of the higher analysis products. The lower average for available P_2O_5 results from the large increase in the tonnage of phosphate rock which contains only 3 per cent of available P_2O_5.

PRIMARY NUTRIENTS

The quantities of primary nutrients in fertilizers are based on the average analyses of samples of the various products as published by the fertilizer control official for the state in which they were consumed, rather than on the manufacturers' guarantees. Thus, the overruns or underruns of nutrients from the guarantees are taken into account. This gives more nearly the actual tonnages of nutrients than would be the case if only the guarantees were used. The actual nutrient content usually averages somewhat higher than the guarantee.

In 1955–56 the primary nutrient content of fertilizers (mixtures and direct application materials) comprised 1,932,-

TABLE 6a

Per cent of increase or decrease in consumption of primary nutrients— year ended June 30, 1956 as compared with preceding year

Region	N		Available P_2O_5		Total P_2O_5		K_2O		Total (N, avail. P_2O_5, K_2O)	
	Mixtures	Materials	Mixtures	Materials	Mixtures	Materials	Mixtures	Materials	Mixtures	Materials
New England	+ 0.25	− 7.14	−0.31	−2.51	−1.34	− 4.11	− 4.78	−15.87	−2.03	− 5.69
Middle Atlantic	− 5.85	−13.11	−7.22	−7.78	−7.18	− 9.38	− 4.65	− 1.29	−5.98	− 9.83
South Atlantic	− .99	− 5.13	−1.55	+ .27	−1.40	+ 7.27	+ 1.10	− 6.76	− .38	− 4.88
East North Central	+ 5.74	− 7.88	−2.26	+2.74	−2.78	+32.57	− 2.56	+ 2.84	−1.38	− 1.78
West North Central	− 9.53	−16.27	−6.90	−5.87	−8.22	+15.96	+ 1.46	+ 6.12	−4.86	−11.01
East South Central	+ .63	+ 3.27	+2.53	−1.91	+1.94	+ 2.36	+ 5.48	− 3.18	+3.28	+ 1.46
West South Central	+ 7.23	+10.86	+8.71	+4.34	+8.23	+ 4.17	+ 7.00	+11.33	+7.84	+ 9.15
Mountain	− 1.95	− 2.86	−4.44	+1.21	−5.31	− .19	+ 6.70	+31.26	−2.41	− .86
Pacific	+ 1.04	+ 5.28	+7.80	+7.13	+7.51	+ 6.12	+14.92	− 2.43	+6.92	+ 5.37
Continental U. S.	− .43	− 1.66	−1.94	− .11	−2.32	+14.18	− .03	+ .98	− .92	− .95
Territories	−10.82	− 7.94	−5.79	+7.92	−7.72	+18.04	− 7.83	+ 6.97	−8.60	− 3.56
United States and Territories	− .86	− 1.82	−1.98	− .05	−2.37	+14.20	− .18	+ 1.24	−1.07	− 1.01

603 tons of nitrogen, 2,247,420 tons of available P_2O_5 (2,643,418 tons of total P_2O_5), and 1,874,718 tons of K_2O (Table 6). Compared with the preceding year, consumption of these nutrients decreased by 27,933 tons (1.42 per cent) of nitrogen, 36,240 tons (1.59 per cent) of available P_2O_5, and 225 tons (0.01 per cent) of K_2O, while total P_2O_5 increased 46,699 tons (1.80 per cent). Although the consumption of fertilizers bearing these nutrients in 1955–56 was 2.42 per cent below that in 1954–55, the total quantity of the nutrients (nitrogen, available P_2O_5, K_2O) themselves was only 1.05 per cent lower.

Mixed fertilizers supplied 41.22 per cent of the nitrogen, 79.43 per cent of the available P_2O_5 (71.79 per cent of the total P_2O_5), and 88.28 per cent of the K_2O. The respective quantities of these nutrients consumed as mixed fertilizers were 0.86, 1.98, 2.37, and 0.18 per cent lower than in the preceding year. While the tonnage of mixed fertilizers in 1955–56 was 3.73 per cent lower than that in 1954–55, the total quantity of nutrients (N, available P_2O_5, K_2O) contained therein was only 1.07 per cent lower.

Fertilizer materials for direct application supplied 58.78 per cent of the nitrogen, 20.57 per cent of the available P_2O_5 (28.21 per cent of the total P_2O_5), and 11.72 per cent of the K_2O. The quantities of nitrogen and available P_2O_5 consumed as fertilizer materials were, respectively, 1.82 and 0.05 per cent lower, while the quantities of total P_2O_5 and K_2O were, respectively, 14.20 and 1.24 per cent higher than in the preceding year. Although the tonnage of materials bearing these nutrients increased 0.62 per cent over that in 1954–55, the total quantity of nutrients (N, available P_2O_5, K_2O) supplied thereby decreased 1.01 per cent. In 1955–56 the increased consumption of phosphate rock was largely responsible for the increase in the tonnage of materials and of total P_2O_5. The phosphate rock used for direct application averages 32 per cent total P_2O_5 but only 3 per cent available P_2O_5.

The percentage difference in the quantity of primary plant nutrients in fertilizer mixtures and materials used in 1955–56, as compared with the quantity in the preceding year, is shown by regions in Table 6a.

The West South Central region was the only region in which increases occurred in the quantities of each of the nutrients in both mixtures and materials. In 1955–56 the total quantity of primary nutrients in the mixed fertilizers used in the United States and territories decreased 1.07 per cent; nitrogen, available P_2O_5, and K_2O decreased 0.86, 1.98, and 0.18 per cent, respectively. In the case of fertilizer materials the total quantity of nutrients decreased 1.01 per cent; nitrogen and P_2O_5 also decreased—1.82 and 0.05 per cent, respectively—but K_2O increased 1.24 per cent.

Tables 6b, 6c, and 6d show the quantities of primary nutrients in the materials applied directly as fertilizers in the years ended June 30, 1955 and 1956.

TABLE 6b

Nitrogen consumed in direct application materials—Years ended June 30, 1955 and 1956

Material	Nitrogen, year ended June 30		Change
	1955	1956	
	tons	tons	tons
Ammonia, anhydrous	290,337	343,578	+53,241
Ammonia, aqua	46,617	62,510	+15,893
Ammonium nitrate	375,318	316,964	−58,354
Ammonium nitrate-limestone mix.	73,753	64,776	− 8,977
Ammonium sulfate	109,245	86,878	−22,367
Calcium cyanamide	14,121	13,515	− 606
Calcium nitrate	8,667	8,630	− 37
Natural organic materials	13,804	13,204	− 600
Nitrogen solutions	38,362	34,493	− 3,869
Phosphate materials	52,973	56,976	+ 4,003
Potash materials	2,525	3,153	+ 628
Sodium nitrate	99,463	87,699	−11,764
Urea	30,973	41,785	+10,812
Other chemical nitrogen materials	837	1,769	+ 932
Total	1,156,995	1,135,930	−21,065

TABLE 6c

Available P_2O_5 consumed in direct application materials—years ended June 30, 1955 and 1956

Material	Available P_2O_5 year ended June 30		Change
	1955	1956	
	tons	tons	tons
Ammonium phosphate: 11-48	18,241	23,265	+ 5,024
Ammonium phosphate: 13-39	14,574	16,568	+ 1,994
Ammonium phosphate-sulfate: 16-20	53,240	52,295	− 945
Basic slag	12,252	14,115	+ 1,863
Calcium metaphosphate	27,100	26,786	− 314
Diammonium phosphate: 21-53	1,508	7,523	+ 6,015
Natural organic materials	12,282	9,740	− 2,542
Phosphate rock and colloidal phosphate	17,924	27,757	+ 9,833
Phosphoric acid	7,669	7,515	− 154
Potash materials	211	73	− 138
Superphosphate: 22 per cent and under	137,878	122,500	−15,378
Superphosphate: over 22 per cent	153,528	147,622	− 5,906
Other phosphates	6,166	6,588	+ 422
Total	462,573	462,347	− 226

TABLE 6d

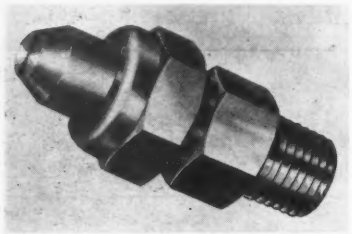
K_2O consumed in direct application materials—years ended June 30, 1955 and 1956

Material	K_2O, year ended June 30		Change
	1955	1956	
	tons	tons	tons
Cotton hull ashes	279	368	+ 89
Lime-potash mixtures	1,477	1,418	− 59
Manure salts	551	246	− 305
Natural organic materials	7,789	5,838	−1,951
Potassium chloride	190,258	194,754	+4,496
Potassium magnesium sulfate	1,418	1,480	+ 62
Potassium sodium nitrate	1,996	2,518	+ 522
Potassium sulfate	12,764	12,926	+ 162
Wood ashes	144	129	− 15
Other potash materials	403	89	− 314
Total	217,079	219,766	+2,687

FARM CHEMICALS
Equipment & Supplies

SPRAY.NG SYSTEMS NEW SPRAY NOZZLES

A new group of TeeJet Spray Nozzles and interchangeable orifice tips have been introduced by Spraying Systems Co. for use in many types of farm spraying.



These new Full Cone TeeJet Spray Nozzles produce a full cone spray in capacities beginning as low as 0.042 GPM at 20 pounds pressure. Five new sizes are offered ranging from 0.042 GPM to 0.100 GPM at 20 pounds pressure.

A data sheet is available giving complete information. Just

CIRCLE 211 ON SERVICE CARD

MINES BUREAU TO TEST PHOSPHATE ROCK PLANER

The Bureau of Mines soon will begin testing an improved phosphate rock planer—a type of continuous mining machine—near Garrison, Mont., Secretary of the Interior Fred A. Seaton announced recently.

Developed during the past several months, the new planer incorporates lessons learned during two years of tests of an earlier Bureau-designed model. Those tests, conducted in the Montana Phosphate Products Co.'s Anderson mine under a cooperative agreement, demonstrated that western phosphate rock can be planer-mined. The newest machine will be tested initially in the same mine near Garrison.

The pneumatically powered planer is about 11 feet long, 30 inches high, 40 inches wide and weighs about four tons. As it is dragged along the face of a sloping vein, pneumatic hammers break the ore, which moves down to a loading station by gravity. The machine has rubber-tired wheels which are kept at an angle to hold it against the face of the ore vein.

Advantages of planer mining seen by Mines Bureau engineers are greater recovery and safety, less disturbance of overlying rock formations because of the elimination of blasting, and less dilution of ore by waste rock from above and below the vein.

BAUGHMAN'S NEW PORTABLE SCREW CONVEYOR

Baughman Manufacturing Co. is now producing a new portable screw conveyor that can be put into operation on any site in a matter of minutes. Trucks can tow the conveyor easily to job sites.

When used for unloading freight

cars, there is no need for pits, the manufacturer reports. In addition, ties need not be removed because the Q-52 Porta Loader can be positioned easily between ties.

Available with either electric or gasoline motor power, the Q-52 will deliver as much as a ton a minute of any free-flowing material.

Complete information can be obtained by

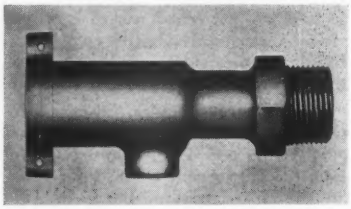
CIRCLING 212 ON SERVICE CARD

MULTI-METER INTRODUCES PLASTIC DRUM FAUCET

A polyethylene plastic drum faucet, which reportedly is a completely new idea in its field, has been introduced by the Multi-Meter Corp.

Designed to fit all ¾" standard drum openings, this full-sized faucet is said to be priced considerably lower than regular metal style faucets and is more durable and of lighter weight.

J. C. Lower of Multi-Meter's sales department reports that some manufacturers of liquid fertilizers have found the faucet to be an answer to the problem caused by chemical reaction of the plant



food with cast iron or brass faucets.

For more details,

CIRCLE 213 ON SERVICE CARD

ACTO-CUTTER ATTACHMENT FOR UNION SEWING HEAD

Savings in both labor and material are possible with a new sewing head attachment, reports Union Bag-Camp Paper Corp. Called Union's I & C Acto-Cutter, the attachment automatically starts and stops the sewing head and also cuts the thread chain between bags.

Among the advantages claimed for the Acto-Cutter are: the "human element" is reduced to a point where an inexperienced operator may be used; one operator can perform the combined operation of carefully forming bag tops and then feeding bags into sewing head; it reduces torn, unsightly and irregular sewn closures to a minimum, saves thread, cuts cost of wasted bags, refills and clean-up time.

Designed for use on the Union Special 80600E Sewing Head, the Acto-Cutter is available in two basic models.

For more details,

CIRCLE 214 ON SERVICE CARD

THE MAN WITH THE MULTIWALL PLAN

UNION
PACKAGING SPECIALIST
J. R. GARMON

takes 40,000 lbs. off a packer's shoulders

Lifting twenty tons of filled bags a day is a lot of labor. It's inefficient, too, as a large chemicals producer learned during a recent survey of his Multiwall operation made by Union Packaging Specialist J. R. Garmon.

Garmon suggested a new system of *sliding* the customer's bags from the check-weigh scale to the bag flattener. This would not only relieve packer fatigue of manually lifting a 40,000 lb. bag load each day, but also assure full-capacity, full-time operation of the bagging equipment.

Union Multiwall Recommendations are based on this 5-star Packaging Efficiency Plan

- DESIGN
- EQUIPMENT
- CONSTRUCTION
- SPECIFICATION CONTROL
- PLANT SURVEY

Another recommended economy tip: redesign style, proportion, and construction of existing multiwall bags. This will result in annual savings of $1400 to $8000 for each 450 M of the various size bags used.

Such savings are not unusual when Union's 5-Star Packaging Efficiency Plan goes to work for a company. Write for complete information about this Plan. It costs nothing. There is no obligation.

Better Multiwall performance through better planning

union camp

UNION'S PACKAGE ENGINEERING DEPARTMENT will study your Multiwall bagging methods and equipment and make appropriate recommendations, regardless of the brand of Multiwalls you are now using.

UNION MULTIWALL BAGS
UNION BAG-CAMP PAPER CORPORATION
233 BROADWAY, NEW YORK 7, N. Y.

FARM CHEMICALS

Equipment & Supplies

NEW RESPIRATOR

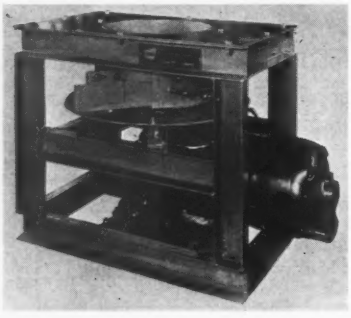
A new respirator, tested and approved by USDA for protection of personnel in the field against Phosdrin, has been developed by the American Optical Co. In addition, the respirator is ap-

proved for protection of personnel in the field against systox, TEPP, HETP, parathion, aldrin, dieldrin, chlordane, EPN and nicotine.

The company said that the respirator uses a new type of filtering material that effectively retains sub-microscopic airborne particles without offering any difficulty to breathing and a bed of activated carbon to remove toxic vapors and gases from the air.

NEW DISC FEEDER FOR EXACT PROPORTIONING

A series of MECO SRV variable speed disc feeders, designed for batching or proportioning of crushed or ground dry material such as chemicals and additives has been announced by The Manufacturers Equipment Co.



Rate of discharge on the feeders is accurately controlled and can be varied during operation with a simple hand wheel adjustment. The smallest unit has a constant feed range from a light trickle up to 2,000 pounds per hour. Larger models can feed up to 80 tons per hour.

For a descriptive bulletin,

CIRCLE 215 ON SERVICE CARD

CLASSIFIED ADVERTISING

NEW RATES . . .
Effective July 1 1957
Help wanted, positions wanted, used machinery and business opportunities are now charged at only 15 cents per word, $2.50 minimum. Count box number as five words.

Display ads . . . $18.00 per column inch, minimum of one inch. Ads over the minimum are accepted only in multiples of one half inch.

For prompt results, send your classified ads to Farm Chemicals. 317 N. Broad St.. Philadelphia 7, Pa.

Closing date: 10th of preceding month

FOR SALE

Complete set of equipment for manufacturing and bagging fertilizer. Including 1 ton Stedman mixing unit, 40¢′ 20″ belt conveyor, 2 Hough payloaders, payloader scales, bagger, sewing machine, conveyors to loading dock, etc. All equipment is now in operation and is standard in every respect—not "Rube-Goldberg." Many more items too numerous to mention. All for $12,000. Will finance. Address "610" care FARM CHEMICALS, 317 N. Broad St., Phila. 7.

FOR SALE

FERTILIZER PLANT. For sale or lease, fully automatic fertilizer mixing and bagging plant, located area of Nashville, Tenn. Cood operating condition. Raw material storage capacity 750 tons. Available immediately. Terms arranged. Address "615" care FARM CHEMICALS, 317 N. Broad St., Philadelphia 7.

FOR SALE: Louisville 8-Roll 36″ Dewatering Presses; Davenport size 2A Dewatering Presses, Louisville Steam Tube Dryers 4′ x 30′ & 6′ x 45′. Perry Equipment Corp., 4130 N. 6th St., Philadelphia 22, Pa.

FOR SALE: Ribbon Mixers 56 to 336 cu. ft.; Hammer Mills 20 to 75 HP; also glass lined tanks, dryers, etc. Perry Equipment Corp., 1430 N. 6th St., Philadelphia 22, Pa.

HELP WANTED

FERTILIZER CHEMIST

An opportunity lies in a newly created position for a graduate chemist or a chemical engineer. Prefer a minimum of two years' experience in mixed fertilizer manufacturing, but will consider an outstanding man to be trained. Duties involve formulation and liaison functions between production, inspection, research, and management.

Some industrial or mechanical experience will be helpful. Kansas City location. Salary open; liberal employee benefits. State age, personal data, experience, education, and salary requirements. Our employees know of this advertisement. Write: Employment Manager, P.O. Box 7305, Kansas City 16, Mo. Attn: Dept. 16.

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CHEMICALS

BIG YEAR AHEAD FOR CHEM. THINNING OF FRUIT TREES

Thinning apples and other deciduous tree fruits with chemical sprays to get fruit of better size and finish and to achieve annual rather than biennial bearing is expected to gain increased popularity with commercial growers this year, USDA reports.

Use of dinitro compounds (mainly in the West) and hormone-type sprays (mainly in the East) during the past ten years has resulted not only in a more marketable fruit, say USDA horticulturists, but has broken up biennial bearing, or "on" and "off" years of heavy and light fruiting, thus making crops more uniform each year.

DEMONSTRATE GIBBERELLIN AEROSOL

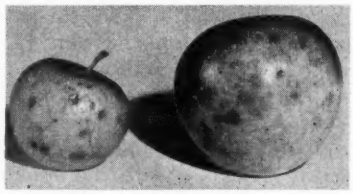
An experimental formulation for aerosol dispensers introduced by Pennsalt Chemicals Corp. to handle the new plant growth stimulant gibberellin, was demonstrated during recent meetings of the Chemical Specialties Manufeaturers Association.

The package consists of a 3-ounce glass vial with a metered valve which provides a measured dosage with each release of the valve. The contents of the dispenser will yield in excess of 500 applications, according to Pennsalt.

Components of the aerosol were supplied by Wheaton Glass Co. and Valve Corp. of America, manufacturers of aerosol containers and valves respectively; Pennsalt, producer of Isotron, the aerosol propellent used in the new package; and Merck & Co., supplier of the active ingredient Gibrel.

FUNGICIDE COMBINATIONS TO CONTROL APPLE DISEASE

Research work and orchard tests by agricultural authorities in the nation's apple-growing areas indicate that teamwork of several chemical fungicides may provide the answer to late summer disease control, reports Union Carbide Chemicals Co.



Apples damaged by botryospheria, one of the newest summer disease threats.

On suggestions by apple experts, growers from the Shenandoah Valley to the orchards of the Midwest are using combinations of chemicals—Glyodin with either Ferbam, Thylate or Zineb—on large blocks of trees. Purpose of the widespread trials is to find a dependable means of defeating costly late summer diseases which rob so many apple growers of profits from a high-quality crop. Two of the newest threats are Botryospheria and X-spot.

EMULSIFIER FOR LIQUID FERT-PESTICIDE MIXTURES

An improvement in facilitating field mixing of emulsifiable pesticide concentrates with liquid fertilizers has been announced by Emulsol Chemical Corporation.

Emcol H-C, the new emulsifier, is an extension of Emcols H-A and H-B which have been in production for some time. The new material is especially recommended in formulating emulsifiable concentrates to be used in high potash fertilizer solutions, Emulsol reports.

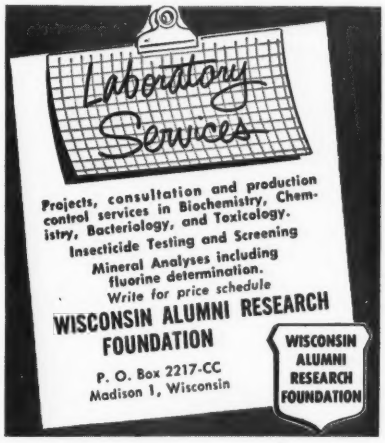
Full details are available in the manufacturer's technical bulletin titled "Formulator's Manual for Liquid Fertilizer-Liquid Pesticide Mixtures." For a copy,

CIRCLE 216 ON SERVICE CARD

REDUCE HI-SIL PRICE

Columbia-Southern Chemical Corp. has announced a price reduction of more than 11 per cent on Hi-Sil 233.

Although the material is used primarily by the rubber manufacturing industry, C-S reports that considerable volumes have been used as a carrier and grinding aid for high concentrate insecticide materials such as DDT.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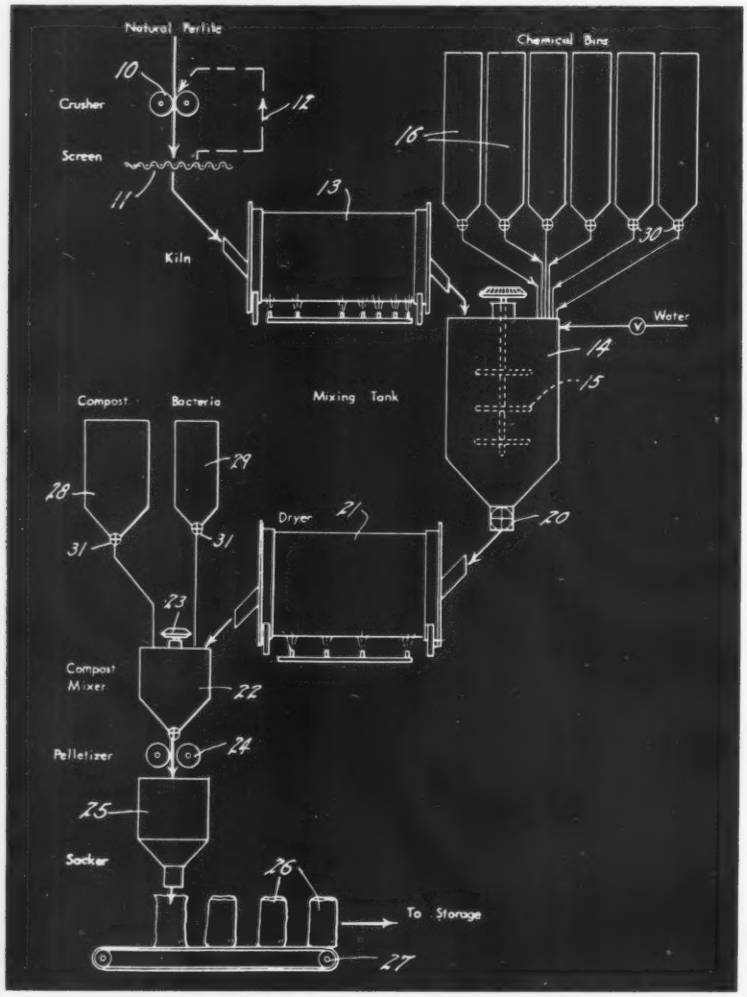
PATENT REVIEWS

MANUFACTURE OF SOIL CONDITIONING AND FERTILIZING COMPOUNDS

U. S. 2,779,670, issued Jan. 29, 1957 to Albert Le Roy Burkett, and assigned to Combined Minerals, Inc., describes a method of manufacturing of compounds which act as both fertilizers and soil conditioners.

As shown in Fig. 1, natural perlite is fed through a crusher 10, set to crush the material to about 8 mesh. The crushed material is screened at 11, and fed to a rotary kiln 13, being discharged at 900–1450° F. The moisture content of the perlite thus expands within the heat-softened glass and forms minute bubbles.

The perlite is discharged from the kiln into an aqueous solution in an agitated mixing tank 14. The rapid cooling sets and fractures the bubbles to form a highly porous, cellular material which forms an ideal base for soil fertilizing chemicals. The treated perlite is fed to a mixing tank 14, where it is mixed with water and with fertilizer chemicals from bins 16. The open pores, cells, bubbles, and interstices in the expanded perlite quickly absorb the liquid solution. The perlite, with its absorbed chemicals, is discharged to a dryer 21, which evaporates most of the water, and is then passed to a compost mixer 22, a pelletizer 24 and finally to storage.



FERTILIZERS

U. S. 2,781,244 (by Clarence F. Hecklinger) and 2,781,245 (by Harold E. Robertson and Barney O. Strom), issued Feb. 12, 1957 and assigned to Allied Chemical & Dye Corp., describe improved methods of recovering ammonia values from ammonia liquors of the type obtained in the working up of coal distillates.

U. S. 2,781,254, issued Feb. 12, 1957 to Eiji Munekata, Kenji Doi, and Toshinori Onodera, assigned to Asahi Chemical Industry Co., Ltd., describes a method of manufacturing a chemical fertilizer by concentrating, drying, and granulating sludge containing 15–45 per cent water, ammonium nitrate, dicalcium phosphate, calcium carbonate, etc., while the loss of the fertilizing ingredients due to chemical reactions among the ingredients is prevented as much as possible.

The reactions to be avoided are

$$2\ NH_4NO_3 + CaCO_3 \rightarrow Ca(NO_2)_2 + 2NH_3 + CO_2 + H_2O$$

and

$$2\ CaHPO_4 + Ca\ CO_3 \rightarrow Ca_3(PO_4)_2 + CO_2 + H_2O$$

These reactions are both suppressed by spraying the sludge into a heated air flow containing CO_2.

U. S. 2,781,612, issued Feb. 19, 1957 to John Warren Dugan and assigned to Flo-Mix Fertilizers Corp., describes a method of soil fertilization, which consists of directing a stream of liquid ammonia toward the soil, blanketing the stream of ammonia with a solution of potash and water just prior to application to the soil, injecting the resultant solution below the surface of the soil, and then injecting a stream of phosphoric acid into the soil. Supersaturated solutions of ammonium and potassium phosphates in anhydrous ammonia are thus formed. Upon entrance of the solution into the soil, normal conditions are assumed and the salts are precipitated and the surplus chemicals

permitted to react with the soil chemicals.

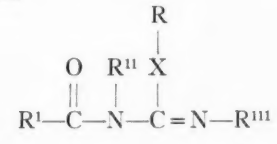
U. S. 2,782,096, issued Feb. 19, 1957 to Jack Ames and assigned to Imperial Chemical Industries Ltd., describes a method of reducing the tendency of ammonium nitrate to cake and set on storage, by coating the surface of the particles with a disulphonic acid of dinaphthylmethane.

U. S. 2,782,097, issued Feb. 19, 1957 to John J. Costolow and assigned to Phillips Petroleum Co., describes a method for increasing the metastable region in an ammonium sulfate solution, thereby reducing the danger of objectionable fines being formed in the crystallizer. The method is based on the use of soluble salts of chromium, iron, and aluminum, providing the following ions: Cr^{+++}, Fe^{+++}, and Al^{+++}.

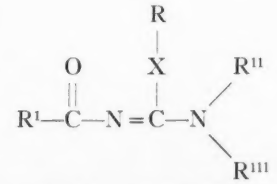
U. S. 2,782,108, issued Feb. 19, 1957 to Herbert R. Antle and assigned to Phillips Petroleum Co., describes a method for the formation of ammonium nitrate prills at a temperature higher than the monoclinic critical crystalline temperature of 84.2° C. The material produced is relatively nonhygroscopic, free-flowing, noncaking, relatively dense, hard and tough.

HERBICIDES

U. S. 2,779,669, issued Jan. 29, 1957 to Jack A. Snyder and assigned to E. I. du Pont de Nemours & Co., discloses the use of acyl pseudoureas as herbicides. These compounds have the formula



or



where X is oxygen or sulfur, and the various R's are organic radicals of various types.

In U. S. 2,780,535, issued Feb. 5, 1957 (same inventor and same assignee), the use of carbamyl pseudourea compounds as herbicides is also disclosed.

U. S. 2,782,111, issued Feb. 19, 1957 to Herman S. Bloch and Alfred E. Hoffman, assigned to Universal Oil Products Co., discloses an herbicidal composition containing an alkylbenzene hydrocarbon (e.g. methyl naphthalene) and 2,4-D or 2,4,5-T.

PESTICIDES

U. S. 2,779,703, issued Jan. 29, 1957 to Willie W. Crouch and Lyle D. Goodhue, assigned to Phillips Petroleum Co., discloses the use of mercury tertiary butyl mercaptide compositions as fungicides. These compounds are effective against peach brown rot, apple bitter rot, as disinfectants for seeds such as rice, barley, or peas, to prevent "damping off" of plants in greenhouses, to treat seed potatoes to prevent "scab," etc.

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PEST REPORTS

Presented in cooperation with the Economic Insect Survey Section, Plant Pest Control Branch, Agricultural Research Service, USDA.

PEA APHID DAMAGE IN SCATTERED AREAS

THE pea aphid, which caused serious damage to alfalfa in large areas of the United States in 1956, is again building up to damaging numbers in various areas this season. By the latter part of May the insect was more serious in the Yuma, Ariz., area than in the past 5 years and causing more damage than the spotted alfalfa aphid in many fields.

The encouraging note was that by the first of June the aphids were apparently on the decline. Populations in Utah were more abundant in the northern and southern areas than elsewhere in the state. In north central Texas counts ranged from light to heavy on vetch with counts of 15 to over 100 aphids per net sweep. In northeast Kansas late-May counts ranged from 160 to 2800 per 25 sweeps. The aphid increased rapidly and became abundant on alfalfa during the last half of May in southeast Nebraska.

Heavy populations were causing damage by the first of June in several areas of Minnesota. Counts up to 22 aphids per sweep were recorded in the central area of the state. Increases were recorded in South Dakota, Colorado and southeastern Illinois. The aphid was abundant in Lewis and Clark and Yellowstone counties, Montana but parasitism was high in Yellowstone county.

In the Eastern part of the United States heavy populations of pea aphids were not as numerous as in the West; however, heavy infestations were found on alfalfa in areas of West Virginia, Virginia, Maryland and Rhode Island. Predators and parasites were active in Virginia.

The alfalfa weevil continues to spread. In May one adult specimen was taken in a newly-established alfalfa field in New Haven county, Conn. This is a first record for that state. Several new county records were reported from New York and Pennsylvania. The pest continued to cause damage in Maryland, Pennsylvania, South Carolina, Virginia and North Carolina. Activity was reported the last week in May from Nebraska and South Dakota and damage from Utah and southern Idaho.

HESSIAN FLY ACTIVE IN GEORGIA & OREGON

Two notes of unusual interest regarding the Hessian fly were received during late May. One note from Georgia reported the insect as being heavy in wheat in several southwestern counties. The other note concerns the insect in Washington county, Oregon, where populations were so severe that several fields of wheat were plowed under.

SPOTTED ALFALFA APHID LOWER THIS SEASON

The spotted alfalfa aphid by the first of June had not reached the damaging proportions that it had in any previous year since its discovery in this country in 1954.

New Mexico had light to heavy infestations in the southern area and Utah reported damaging populations in late May with 600 acres of alfalfa being treated in Washington county. Some treatment was necessary in Nye county, Nevada. Predators have been an important factor in reducing populations in the Yuma, Ariz. area.

The first spotted alfalfa aphid specimen found in Nebraska this year was taken May 23 in Nemaha county. Populations in eastern states known to be infested were generally light up to early June. Some honeydew was reported from localized areas in North Carolina.

ARMYWORMS AND VARIEGATED CUTWORMS HEAVY IN SOME STATES

Armyworms by the latter part of May had developed into outbreak numbers in several Maryland counties. Counts up to ten worms per linear foot of row were recorded. Barley, hay mixtures and corn were being damaged and treatment was underway. Delaware reported an outbreak from eastern Kent county and in Virginia outbreaks were recorded and controls required in eastern and northern counties.

In local areas of Davie county, North Carolina, armyworms were responsible for clipping one-third of the heads in small grain fields. From northwestern Arkansas damage was reported as being caused by a mixture of armyworms and variegated cutworms. In central Texas armyworm was generally heavy in small grains with populations up to 40 per square foot. Movement to corn was underway in this area. Damaging infestations occurred throughout Oklahoma with most control measures being applied in southern areas.

The armyworm threat was over in Louisiana and parasites and disease were killing up to 40 per cent of the larvae in southern Missouri.

In late May, the variegated cutworm was causing damage in several states. In southwest Missouri heavy populations were destroying new alfalfa growth and controls were necessary. In southeast Kansas populations up to 6 per square foot were recorded in alfalfa. Small grain and vetch were infested in north central

. . . PESTS

Texas. Oklahoma reported medium to heavy damage to legumes.

OTHER INSECT ACTIVITY

Plum curculio populations were on the increase in untreated orchards in the Vincennes, Indiana, area by late May. In the Carbondale, Illinois area large numbers were present with more damage than in 1956. Populations were on the decrease at Wooster, Ohio and in both Pennsylvania and Rhode Island cuts were present on fruit. At Fort Valley, Georgia, first-generation adults were expected to emerge the last week in May.

The first codling moth larvae hatched at Vincennes, Indiana, May 18. Development was generally slow. At Carbondale, Illinois 50 per cent of the larvae were dead due to weather conditions. By late May emergence was more than 50 per cent in Delaware and Ohio and moths were taken in Kansas, Utah and Oregon.

Brood XIV of the periodical cicada has been seen and heard in several states by the latter part of May. Large numbers of the cicada were reported in the Norris Dam area of Tennessee and throughout the eastern half of that state. Damage was caused by egg-laying in Caldwell county, North Carolina. The insect was also abundant in several other counties of the state.

Emergence in Northumberland county, Pennsylvania, was observed May 17. No damage had been noted in the state by the first of June. In Indiana adults emerged about May 12 at Nashville and May 21 at Orleans.

The periodical cicada causes damage to young twigs by its egg-laying punctures. In some instances this damage can be very severe but usually the noise associated with the cicadas attracts more attention than does the damage.

The second survey to be conducted this year to determine potato psyllid potentials was made during the week of May 20–24.

Populations of the insect were less than on the earlier survey east of the mountain range in Wyoming and Nebraska but on the increase on the eastern slope in Colorado. All indications point to a severe yellows epidemic in the Colorado, Nebraska, Wyoming area this season. Populations were low west of the Rocky Mountains.

By late May mosquitoes were becoming a problem in several states that have been receiving excessive rains. In Texas mosquitoes were numerous over most of the state. In southeastern Arkansas the insects were severely attacking cattle. Increase was also noticeable in other flooded areas of the state. The same was true in southeastern Kansas which has been receiving unusually heavy rains. An outbreak of mosquitoes was reported from Torreya State Park, Liberty county, Florida, due to flooding which was not present last season.

Screw-worm cases were reported from Lincoln, Columbia and Crawford counties, Georgia in late May. All cases were in calves.

THOMPSON CHEM. STOPS PRODUCING INSECTICIDES

Thompson Chemicals Corp. has announced it will withdraw entirely from the production and distribution of the presently known agricultural insecticides.

Announcement of the firm's withdrawal from the field of broad spectrum insecticides was made by Wm. T. Thompson, president of the firm, in the following statement.

"A 12-year study has convinced us that the currently known and used broad spectrum insecticides are at best palliative and may prove dangerous in the long run.

"The growing number of insect pests becoming resistant to presently used insecticides demonstrates a serious inherent danger in their widescale use. The imbalance of the fauna population caused by the destruction of natural predators and parasites (thus allowing uninhibited development of the insect pest) can easily cause heretofore unimportant insects to increase to the status of economic pests.

"The ingestion of presently employed insecticide residues by humans and other warm-blooded animals is a correlative problem of a highly serious nature. The industrial hazards inherent in the use of chemicals of such highly toxic nature is also cause for great concern.

"Our study convinces us that any sound approach to the control of agricultural pests must be sought in chemical mechanisms that are selective between the insect pest and the beneficial insects. The study of physiologically and ecologically selective mechanisms must be the primary concern of research.

"Our future research in the field of insect control of agricultural pests will be in the exploration of selective insecticide chemicals. It is our hope that we may be able to make some worthwhile contributions to the agricultural control of insect pests and subsequent yield increases of a more permanent nature.

"Our current production will be devoted to a comprehensive line of agricultural and industrial chemical specialties in which we are admirably qualified."

U. S. SULFUR OUTPUT INCREASES 5% IN '55

Production of sulfur in all forms in the U.S. during 1955 increased 5 per cent over the previous year, reaching a total of 7,020,528 long tons, according to reports of producers to the Bureau of Mines, U. S. Dept. of the Interior. Of the total output, about 82 per cent was native sulfur, 6 per cent recovered sulfur, 6 per cent was in pyrites, 5 per cent in smelter acid and 1 per cent in other forms.

Most Frasch mines reportedly increased production during 1955. One new Frasch mine was placed in operation and another was closed. Development of Mexico as a major producer of Frasch sulfur was particularly noteworthy.

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STATISTICS

WORLD OUTPUT OF NATIVE SULFUR AND POTASH

The following figures on world production of potash and sulfur were taken from tables compiled by Helen L. Hunt of the Bureau of Mines, which will be published in the Minerals Yearbook, 1955.

World Production of Native Sulfur, by Countries[1] 1946–50 (average) and 1954–55, in long tons[2]

Country[1]	1946–50 (average)	1954	1955
North America:			
Mexico	5,260	52,407	475,487
United States	4,622,855	5,578,973	5,799,880
South America:			
Argentina	9,381	17,000	22,000
Bolivia (exports)	2,827	2,565	3,975
Chile	11,873	39,075	54,132
Colombia	[3]569	5,118	5,413
Ecuador	27	64	1,550
Peru	1,520	—	—
Europe			
France (content of ore)	5,586	—	—
Italy (crude)[4]	175,421	200,215	176,917
Spain[5]	4,400	5,400	6,500
Asia:			
Japan	48,617	184,244	199,219
Philippines	—	761	[5]3,700
Taiwan (Formosa)	1,077	5,873	4,854
Turkey	3,421	9,862	11,318
Total (estimate)[1]	5,000,000	6,300,000	7,000,000

[1]Native sulfur believed to be also produced in U.S.S.R., but complete data are not available; estimated by senior author of chapter are included in the total. [2]This table incorporates a number of revisions of data published in previous sulfur chapters. Data do not add to totals shown due to rounding where estimated figures are included in the detail. [3]Average for 1948–50. [4]In addition, the following tonnages of ground sulfur rock (30 per cent S) were produced and used as an insecticide: 1946–50 (average), 16,600 tons; 1954, 22,803 tons; 1955, 21,560 tons. [5]Estimate.

World Production of Potash (marketable, unless otherwise stated) in equivalent K_2O, by countries[1], 1946-50 (average) and 1954-55, in short tons[2]

Country[1]	1946-50 (average)	1954	1955
North America:			
United States	1,101,537	1,948,721	2,064,808
Crude (including brines)[3]	1,205,037	2,170,969	2,340,052
South America:			
Chile	[4]1,251	[5]	[5]
Europe:			
France (Alsace)	791,833	[6]1,198,200	[6]1,311,800
Crude[3]	883,548	1,361,734	1,490,764
Germany East[6]	985,400	1,488,000	1,582,000
Crude[3, 6]	1,134,200	1,720,000	1,820,000
West	585,887	1,783,394	1,870,848
Crude[3]	695,520	2,134,072	2,226,666
Spain	175,660	243,166	235,343
Asia:			
India	2,665	1,653	[6]1,600
Israel	22,393	[6]12,000	11,905
Japan	148	454	461
Africa:			
Eritrea	128	—	—
Oceania:			
Australia	774	—	—
World total (marketable) (estimate)[1]	3,800,000	7,000,000	7,500,000

[1]In addition to countries listed, China, Ethiopia, Italy, Korea, and U.S.S.R., are reported to produce potash salts, but statistics of production are not available; estimates by senior author of chapter which will appear in Minerals Yearbook, 1955, included in totals. [2]This table incorporates a number of revisions of data published in previous potassium salts chapters. Data do not add to totals shown due to rounding where estimated figures are included in the detail. [3]To avoid duplication of figures, data on crude potash are not included in the total. [4]Average for 1947–50. [5]Data not available; estimate by author of chapter which will appear in Minerals Yearbook, 1955, included in total. [6]Estimate.

Production — March, 1957

Compiled from Government Sources

Chemical	Unit	March 1957	March 1956	February 1957
Ammonia, synth. (anhydrous)	s. tons	320,733	316,734	294,103
Ammonia liquor, coal & coke (NH_3 content)	pounds	3,158,494	3,171,752	2,910,330
Ammonium nitrate, fert. grade (100% NH_4NO_3)	s. tons	201,544	196,357	172,094
Ammonium sulfate				
synthetic (technical)	s. tons	97,834	98,910	96,665
coke oven by-product (inc. amm. thiocyanate)	pounds	161,510,436	167,837,992	142,831,654
BHC (Hexachlorocyclohexane)	pounds	4,379,199	7,946,551	5,603,790
Gamma content	pounds	693,343	1,223,456	797,289
Calcium arsenate (commercial)	s. tons	[1]	962	901
Copper sulfate (gross)	s. tons	6,424	—	5,424
DDT	pounds	11,522,140	11,083,360	9,311,169
2,4-D Acid	pounds	2,555,211	2,521,997	2,759,080
esters and salts	pounds	2,581,329	2,038,719	2,191,622
esters and salts (acid equiv.)	pounds	2,138,802	1,622,942	1,534,666
Lead arsenate (acid and basic)	s. tons	702	810	1,030
Phosphoric acid (50% H_3PO_4)	s. tons	380,992	331,581	351,157
Sulfur, native (Frasch)	l. tons	471,548	485,963	439,997
Recovered	l. tons	39,800	38,100	39,000
Sulfuric acid, gross (100% H_2SO_4)	s. tons	1,404,121	1,441,266	*1,309,898
Superphosphate (100% APA)	s. tons	229,138	246,634	*216,022
Normal and enriched (100% APA)	s. tons	138,234	152,441	*132,189
Concentrated (100% APA)	s. tons	70,173	74,414	*65,253
Other phos. fertilizers (incl. wet-base goods)	s. tons	20,731	19,779	18,580
2,4,5-T Acid	pounds	283,090	375,150	277,588
Urea	pounds	83,100,681	71,934,920	78,968,764

* Revised. [1] Withheld to avoid disclosing figures for individual establishments.

FERTILIZER MATERIALS MARKET

New York

June 20, 1957

Sulfate of Ammonia. By-product coke producers of sulfate of ammonia announced the same price schedule as last season but the synthetic producers in some cases advanced the price about $2 per ton at several points. Stocks are in good shape because of previous export business. There is no great surplus at the present time and steel production is expected to decline shortly.

Urea. No price changes were noted recently since the price was advanced about $5 per ton.

Nitrogenous Tankage. The present market is quoted at from $3 to $3.50 per unit of ammonia ($3.64 to $4.25 per unit N) according to shipping points. Demand is fair because the present prices are low in comparison with former years and most buyers feel the material is cheap.

Castor Pomace. At the present time, no material is being produced in the East and the producers do not know when they will start up again. Last sales made sometime ago were on the basis of $45.50 per ton, f.o.b. production point.

Organics. Organic fertilizer materials were quiet because the demand is rather limited at present; most manufacturers have completed their mixing for the Spring season. Tankage and blood last sold at $5 per unit of ammonia ($6.08 per unit N) f.o.b. Eastern production points. Soybean meal sold as low as $41.50 per ton, f.o.b. Decatur, Ill., in bulk and cottonseed meal was quoted at $51 per ton, f.o.b. Memphis but there was not much available as most mills have completed their grinding operations. Linseed meal was weak at $52 per ton, f.o.b. Minneapolis, in bulk.

Fish Meal. With fishing operations in full swing, reports were coming in that fishing had been poor in some sections and good in others. Scrap was available on a "when and if made basis" of $125 per ton, f.o.b. fish factories but it was thought that some plants had a heavy carryover from last season. Very little imported material was coming in.

Bone Meal. The market for imported material was slightly easier as stocks accumulated at various ports. This is the feeding grades and prices are about $60 to $62.50. Domestic fertilizer bone meal is quiet and demand limited with last sales made at $60 per ton, f.o.b. shipping points.

Hoof Meal. Last sales on the basis of $5.75 per unit of ammonia ($6.99 per unit N) f.o.b. Chicago, Ill.

Superphoshate. This market is a rather routine affair with buyers content to take delivery when they need material and it is mostly a hand-to-mouth proposition. No price changes were noted.

Potash. Several producers have altered their price schedules from last season and in some cases it is reported there has been a slight reduction in prices. Competition in potash is bound to be keen this season because of the fact that another new producer is in the field.

Philadelphia

June 20, 1957

In general, the materials market is rather slow, except possibly urea and sulfate of ammonia, which have enjoyed quite a large export demand. Blood and tankage are a little easier, as is also fish scrap. It is fully expected that the total tonnage of mixed fertilizers will fall behind last year.

Sulfate of Ammonia. The supply position has been a little tight, due principally to foreign demand, but it is reported somewhat easier at present. The synthetic grade price is being advanced July 1 to $34 per ton, but the fertilizer grade is still listed at $32.

Ammonium Nitrate. While stocks have been reduced, there is still ample material on hand and production is large. A price change is scheduled for July 1 involving an advance of about $4 per ton.

Nitrate of Soda. No changes are reported in the nitrate situation. Stocks are ample and prices remain at $43.50 per ton in bulk and $47 in bags for domestic grade; and $46 bulk and $49.50 bagged for Chilean.

Urea. This supply position is reported as very tight and price remains at $110 per ton.

Blood, Tankage, Bone. Market is quiet with blood priced at $5.25 per unit ammonia ($6.38 per unit N) in New York and $6 ($7.29 per unit N) Chicago. Tankage is quoted at $5 per unit ($6.08 per unit N) New York and $5.75 ($6.99 per unit N) Chicago. Bone meal remains at $60 per ton for fertilizer grade, and $68 to $70 per ton for feeding grade.

Fish Scrap. Supply is said to be satisfactory, with fair demand. While production seems to be ahead of last year, imports are very much lower. The prices indicated are $125 per ton for scrap and $130 per ton for menhaden meal.

Phosphate Rock. New prices have been published showing a reduction of about 4½ cents to 5 cents per ton. This is due to reduction in fuel oil cost.

Superphosphate. Production is being slackened and inventories reduced. Listed prices still show 90 cents to 93 cents per unit A.P.A. for normal grade and 98 cents per unit for triple grade.

Potash. A new quotation starts at 34½ cents per unit K_2O in July, and then 35 cents August through May. Another list starts at 34½ cents per unit for July and August and gradually reaches 36½ cents for November to April; then 36 cents in May, 34 cents June 1958.

Reviewing Research

BETTER PRACTICES MEAN MORE

Honey bees, fertilizer and insecticides—those are the ingredients needed to spell success in legume seed production.

That's the conclusion of a group of University of Minnesota scientists after years of experimental field work in northern Minnesota.

They have found that poor pollination, lack of phosphate and potash nutrients in the soil and harmful insects have been responsible for low seed yields in alsike clover, red clover, alfalfa and sweetclover—Minnesota's main forage legume seed crops.

In carefully controlled field trials, the scientists compared different honey bee stocking rates, fertilizer treatments and insect control with no control, no bees and no fertilizer.

Wild bees, they concluded, couldn't be depended upon for pollinating the crop. So it's necessary to stock the fields with honey bees.

With alsike clover, for example, where there were no honey bees for pollination, no insect control and no fertilizer used, yields averaged 15-20 pounds per acre. But with honey bees nearby, 1,000 pounds of a phosphate-potash fertilizer added and 1½-2 pounds of DDT sprayed on each acre, alsike yields went up to 800 pounds per acre.

Results were similar in other seed crops. Sweetclover averaged 6 pounds per acre when none of the three practices was used. Pollinated sweetclover that received no fertilizer or insect control yielded 1078 pounds per acre and where all three practices were followed, yield was 1,438 pounds from each acre.

The experimental yields were far above state averages. Yields for Minnesota as a whole for these crops, based on 1942-51 figures, averaged as follows: alsike, 114 pounds per acre; red clover 59 pounds; alfalfa, 49 and sweetclover, 180 pound per acre.

HOW CRAG GLYODIN WORKS

Agricultural experiment station tests show that Crag Glyodin, a leading fungicide for control of fruit diseases, acts in beneficial ways unusual to most fungicides. The chemical suppresses mites that plague orchards, and also has been found to increase effectiveness of some commonly-used insecticides when applied in combination sprays.

In recent tests conducted at Maryland and New Jersey experiment stations, Glyodin killed adult mites and nymphs on contact. Its performance is good enough to have considerable economic significance, according to the test.

Glyodin, in combination with DDT, was used as a 4X concentrate at the rate of 4½ quarts per 100 gallons of spray in the Maryland work, and was tested on two-spotted mites. In comparison with one miticide and two fungicides, which were also combined with DDT, Glyodin gave the best results among the fungicides, and was practically as good as the miticide.

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a second look at consumption figures

After spending several days at the NPFI annual meeting and hearing the economist's optimistic talk on how much fertilizer this country can use, it was indeed discouraging to come home and find that for the second consecutive year the total tonnage of fertilizer and fertilizer materials consumed the U. S. and its possessions declined slightly from the previous year.

This is reported in the consumption report released by the Department of Agriculture for the year ending June 30, 1956, and reprinted in this issue of FARM CHEMICALS.

Even more discouraging is that for the first time in 17 years, the total consumption of primary plant nutrients also decreased from the previous year.

The USDA report shows that fertilizers used in 1955–56 contained 6,054,741 tons of nitrogen, available P_2O_5 and K_2O, a decrease of 1.05 per cent from the 1954–55 consumption of 6,119,139 tons.

Tonnage-wise, total consumption in 1955–56 amounted to 22,193,070 tons compared with 22,726,-464 tons in 1954–55 and 22,773,499 tons on 1953–54. The 1955–56 consumption was 2.35 per cent less than in 1954–55. Of the 1955–56 total, 21,403,465 tons of products contained one or more of the primary plant nutrients, a decrease of 2.42 per cent from 1954–55.

Following are comparisons for the primary plant nutrients:

Nutrient	1955-56 Consumption (tons)	1954-55 Consumption (tons)	Per Cent Decrease
Nitrogen	1,932,603	1,960,536	1.42
Available P_2O_5	2,247,420	2,596,719	1.59
Potash	1,874,718	1,874,943	0.01
TOTAL	6,054,741	6,119,139	1.05

The average primary nutrient content of fertilizers bearing primary nutrients increased to 28.29 per cent in 1955–56 from the 1954–55 average of 27.90 per cent.

Only two regions—the West South Central and the Pacific—showed increases in consumption over the previous year, while in the other regions, decreases in consumption were recorded ranging up to nearly 11 per cent.

The total consumption of mixed fertilizers in 1955–56 was 14,775,653 tons, a 3.73 per cent decrease from the 15,347,850 tons reported for 1954–55. Decreases were recorded in all regions except the Pacific. Four grade ratios accounted for just over 50 per cent of total consumption of mixed fertilizers. These four most popular ratios were 1:4:4, 1:2:2, 1:1:1, and 1:3:3 in that order. The 5-10-10 grade replaced 3-12-12 as the most popular in 1955–56. The top 15 grades remained the same, however, as in 1954–55 except that 6-12-12 replaced 4-8-8.

There was a slight increase in the consumption of fertilizer materials for direct application—7,417,417 tons in 1955–56 as compared with 7,378,612. The tonnages reported for direct application include phosphate rock, however. By eliminating phosphate rock, for which a substantial increase was reported, 1955–56 consumption of materials for direct application actually shows a decrease of about 4.2 per cent. Materials for direct application supplied 58.78 per cent of the total nitrogen, 20.57 per cent of the total available phosphate, and 11.72 per cent of the total potash.

These figures point up the old saying that farmers in times of poor prices will cut fertilizer purchases. And you couldn't actually call '55 and '56 bonus years for the farmer.

The figures point up too, the big job of education that still faces the industry. It makes the expansion program to be undertaken by the Institute even more important. And it shows too, what a big job they have ahead of them.

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American Cyanamid Co., New York City
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Escambia Chem. Corp., Pensacola, Fla.
Grand River Chem. Div., Deere & Co., Tulsa, Okla.
Mississippi River Chem. Co., St. Louis, Mo.
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Sinclair Chemicals, Chicago, Ill.
Sohio Chemical Co., Lima, O.

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Phillips Chemical Co., Bartlesville, Okla.

AMMONIUM SULFATE
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The Burlap Council, New York City
Chase Bag Co., Chicago, Ill.

BAGS—COTTON
Chase Bag Co., Chicago, Ill.

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Chase Bag Co., Chicago, Ill.
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American Potash & Chemical Corp., Los Angeles, California
Woodward & Dickerson, Inc., Philadelphia, Pa.

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FERTILIZER—Liquid
Clover Chemical Co., Pittsburgh, Pa.

FERTILIZER—MIXED
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International Min. & Chem. Corp., Chicago, Ill

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Duval Sulphur & Potash Co., Houston, Tex.
International Min. & Chem. Corp., Chicago, Ill.
National Potash Co., N. Y. C.
Potash Co. of America, Washington, D. C.
Southwest Potash Corp., New York City
United States Potash Co., N. Y. C.

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International Min. & Chem. Corp., Chicago, Ill.
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International Min. & Chem. Corp., Chicago, Ill.
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